

RECORD

20/267 R 44653 1-145120

Book 71

Begin # 44653
End # 45120

first adult Blenniids collected

11-01 (44653 - 4501) (all cast)
(45024 - 45044)

11-01 small well developed Blenniids

11-02 (adult) males with 11 scales
11-03 ... between numbers

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Collection and Field Note Book

No. 71

(Jan. 16, 1964 - Feb. 9, 1964)
(44653 - 45120)

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Book 71

Begin # 44653

End # 45120



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1

jan. 16 - Flight - Washington
(Chantilly) to New Orleans -
at. side Boeing 720.

Ground snow-covered.

10:00 Take-off to west or southwest.

Rows of *Juniperus virginiana*,

conspicuous along roads,

and fences. About 10% or

perhaps more, in patches

of woods - mostly deciduous

but with many patches

of *Pinus virginiana* in

the hardwood areas -

these almost all angular

patches, occasional diffuse

area of concentration of

pine in the hardwood - but

the angular patches mostly

dense and black.

10:35 maintaining same

course, the patches of hardwood

become more and more

mixed with pine. Now

dominantly mixed forest

but still with angular

patches of pine.

10:35 Visibility poor, then snow.

10:57 An extensive and confused

mass of mountains, with a

very complicated reservoir.

Several larger ranges in

middle and far distance.

10:59 Larger mts. just to rt. of course.

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These mostly covered by deciduous forest. Some pine, mainly angular patches, on lower mts. which have much of forest cleared.

11:00 Larger mts. diverge to rt. On both sides of them piedmont type of landscape with much clearing, much deciduous forest and much pine in angular patches. - perhaps about $\frac{1}{3}$ of each type, pattern very small irregular patchwork (from 3000').

11:13 Mts. are at a considerable distance now.

A high isolated peak just to rt. of course in piedmont.

11:04 A large winding river just s. of this peak.

11:05 Mt. range swings a bit closer. Small bits of mountain in piedmont, gradually becoming more numerous and coalescing into a mountain area, trending toward main range.

11:10 Another large river.

11:19 Capt. mentioned Spartanburg but could not see it.

Many reservoirs. Red soil in extensive cleared land. almost no snow now.

1:02 Appr. landing at New Orleans. Just before end of runway a large area of apparently undisturbed swamp tree, almost touching, standing water. Before that a lake with much aquatic vegetation, mostly submerged and floating, a few bushes

La Cofradia
Eusebio Ponce
Escriguez

in. (rain) (no umbrella)
)
)

hatched in

10 min.)

ugly.

irregular

ree rounded

? This on high clay soil.
tation is an
scrub, Prosopis,
incl. Celtis pallida.
nd some higher
loose forest
of Celtis, with

some you --- virginiana,
undergrowth of Condalia,
Prosopis, Acacia esp.

Barley areas are in grass.
Great flocks of little brown cranes.

La Captiva
Camilo Ponsas.
Enrique

- These mostly covered by deciduous forest. Some pine, mainly angular patches, on lower mts. which have much of forest cleared.
- 11:00 Larger mts. diverge to N. On both sides of them piedmont type of landscape with much clearing, much deciduous forest and much pine in angular patches. - perhaps about $\frac{1}{3}$ of each type, pattern very small irregular patchwork (from 3000').
- 11:13 Mts. are at a considerable distance now.
- 11:04 A high isolated peak just to N. of course in piedmont. A large winding river just S. of this peak.
- 11:05 Mt. range swings a bit closer to small bits of mountain in piedmont, gradually becoming more numerous and coalescing into a mountain area, trending toward main range.
- 11:10 Another large river.
- 11:19 Capt. mentioned Spartanburg but could not see it. Many reservoirs. Red soil in extensive cleared land. almost no snow now.

- 1:02 Appr. landing at New Orleans. Just before end of runway a large area of apparently undisturbed swamp - tree, almost touching, standing water. Before that a lake with much aquatic vegetation, mostly submerged and floating, a few bushes emergent.
- 1:33 Left New Orleans. (rain) (no umbrella)
4:02 Left Houston (rain)
(Chicken coop architecture in great tracts).
- Jan. 16 - Linton (10 miles.) Welder W.F. Refuge. *Quercus virginiana* woodland. Trees rounded about 8 m tall. This on high ground, dark clay soil. General vegetation is an open thorny scrub, *Prosopis*, *Cordia*, etc. incl. *Celtis pallida*. In ravines and some higher areas open to closed forest or woodland of *Celtis*, with some *Quercus virginiana*, undergrowth of *Cordia*, *Prosopis*, *Acaia*, etc. Landings areas are in grass. Great flocks of little brown cranes.

Jan. 18 - Welder W.L. Refuge

2 photos near bg. -

Prosopis savanna - coppice type mesquite 3-4 m. tall, one live oak tree (b+w). Extensive type here, merging to live-oak woodland.

3 photos (b+w) of Condalia deciduous thorn scrub near Morley Creek.

2 photos (b+w) of savanna with a few scattered clumps of mesquite and *Ganthoxylum* (?) and very low patches of mesquite and *Opuntia* cf. *leptocaulis*, near Lagarto Wash.

Photo (b+w) Aransas R. just s. of pavilion Bend.

photo along terrace, sand plain, *Acacia farnesiana* open fl scrub forest in bg.

subfossil snails same place.

River terrace forest of *Celtis reticulata*, *Ebrietia*, *Lycium*?

Jan. 18 - Welder W.L. Refuge

near headquarters

Scattered *Quercus virginiana*, patches of open grass, patches with open to semi-close mesquite brush.

Under the live-oaks and to some extent under the larger mesquite bushes a shrub layer of ~~Acacia~~ mostly evergreen usually spiny or prickly bushes of *Ganthoxylum fagopyrum*, *Ulmus spinosa*, *Baileya* (n.) *Opuntia leptocaulis*, *Elaeotis*, etc. (photos b+w & b+d.)

Also under these trees green seedlings and rosettes of *Urtica urens*, *Stellaria media*, *Panetaria*, *Bowlesia*, *Oxalis*, *Geranium*, etc.

Photo of an "ant yard" an open space kept completely clean, by *Psammomyrmex* sp. (?) (large, red) (b+w. b+d.)

Annuals springing up in great numbers after the heavy rain on Jan. 15. *Hedysarum*, *Alopappus*, + *Oxalis* beginning to flower.

✓ Jan 18 1964 Texas

6

✓ 53 Jan 18 - Welder Wildlife Refuge
Javelina Bend, Aransas R.
in open to closed scrub
forest, mixed deciduous
and evergreen.

✓ 44653 *Celtis spinosa* var. *pallida* (Tou.) M.C. Gr.
common

✓ 54 *Ehretia anacua* (Berg.) J.M. Gr.
common

Jan. 18 Welder Wildlife Refuge
Moody Camp
live-oak woodland

✓ 55 *Tillandsia recurvata* L.

Jan. 18 - Welder Wildlife Refuge
near headquarters
irregular open woodland
of *Prosopis glandulosa* and *Quercus virginiana*.

✓ 56 *Zanthoxylum fagara* L.
common in shrub layer under
oak trees

✓ 57 *Zanthoxylum fagara* L.
common in shrub layer
under oak trees

✓ 58 *Hedysotis caerulea* var. *minor*
rare on open bare soil.

Jan. 19 - Welder Wildlife Refuge
Hackberry Mott, along Aransas River

✓ 59 *Phoradendron secundinum* cf. var. *pubescens*
(Engelm.) M.C. Gr.
parasitic on *Celtis*, in
scrub forest.

7

spiny shrub 3 m. tall

small tree 5 m. tall

forming balls on twigs
and small branches
of trees.

shrub, 2 m. tall, aromatic
when broken, buds maroon

shrub 2 m. tall, aromatic
when broken, buds bronze-green

flower violet, eye slightly
reddish.

flowers green, numerous.

Jan. 19. Welder W. F. Refuge
Huckleberry Mott, Drawn R.

in Mott - as a scrub
forest - in dry soil
a forest of Celtis about
1.5 m. tall, closed or almost

under a layer of evergreen
shrubbs. *Garrya elliptica*,
Acacia, *Opuntia*, *Cylindropuntia*,
Acacia, *Thornolia*, *Yucca*,
some deciduous in one

Openings + semi-shaded places,
if slightly low, are covered
by a pure stand of *Aster*
spinosa.

Photos of *Tillandsia recurvata*. (bot.)

Pecan Mott - a broad
swale, narrow with tall
Celtis, *Carp. illinoensis*,
Ulmus crassifolia etc.
on sides - up to 15 m. (photos)
open somewhat grassy
bottom, brushy flats
beside it

Many shrubs in
undergrowth
cardinals, woodpecker, phoebe,
Mocking birds, thrasher,
hermit thrush, and swarms
of miscellaneous sparrows.
American egret on river.

dense
black
clay
soil

On upper part of side of
ravine a low, almost
mat-like layer of *Malpighia*
glabra partially covers
the ground.

Jan. 20 - Welder Wildlife Refuge

in Sect. 44 lot 11. Kod. photo
of a flock of turkey hens.
another of deer.

Near Mesquite Tanks -
an open shrub savanna
dominantly grass but
with scattered *Opuntia*
lindheimeri and bushes
of low (0.5 m.) *Prosopis*, clumps
of *Opuntia leptocaulis*,
and small *Acacia farnesiana*
with scattered patches
of an evergreen to semievergreen
thorn scrub of *Berberis*
trifoliata with some ~~the~~
Celtis spinosa and a
little *Opuntia leptocaulis*.
This scrub varies from
dense to open.

A number of photos b.w.
kod. of this - and (bot. vol.) and
views of savanna + of scrub
and of some individual
plants incl. *Berberis* +
Opuntia leptocaulis & *lindheimeri*.

Jan. 19 - Welder Wildlife Refuge
Pecan Mott, along Aransas River,
on flat open roadside,
almost bare soil.

- 44660 *Euphorbia q. serpens* HBK.
common locally
- 61 *Verbena q. bipinnatifida* Nutt.
common locally
- 61a *Leonurus sibiricus* L.?
same - in open to closed forest
- 62 *Diospyros texana*
common
- 63 *Baccharis angustifolia*
~~occasional~~, on steep bank of river
- 64 *Tillandsia usneoides*
common ~~or~~ hanging from
branches of tree

Jan. 19 - Welder Wildlife Refuge
Hackberry Mott, Aransas River

- 65 *Amyris texana*
common in undergrowth

Jan. 19 - Welder Wildlife Refuge
Pecan Mott, Aransas River

- 66 *Carya illinoensis*
common in forest in swaly rav.

very prostrate, thin mat.
stems reddish.

prostrate, flowers
purple.

sterile shrub, to 3 m. tall.

shrub 3 m. tall, 4 cm. thick
near base, broad leaves on
lower branches, branches
strongly ascending,
pendent

shrub with a somewhat
skunk-like odor when broken.

small tree, 4 m. tall, (others
seen to 15 or more m.).

Jan. 20 - Welder W. I. Refuge
so. of Chico Tank and
Coyote Mill.

A fair sized area of
a grassland with
thickly scattered low
patches of low creeping
Prosopis glandulosa and
Opuntia leptocaulis.
Each (or most) clump
of mesquite, 2-5 m.
across, is filled with
a dense growth of *Opuntia*.
The whole 0.5-0.8 m. tall.
Scattered in this are a
few *Opuntia lindheimeri*
and *Berberis*, also a few
Acacia, but these not
very significant.

The grass is mixed very
short and up to 1 m.

Photos (b.v.w. + Kod. begin Kod. - 2)

Tule Bend, Aransas R.

Turns with light gray
back, black exp patches
& bright red bill.

Bet.

and Tule Bend a semi-
evergreen open to closed
thorn scrub -

Acacia rigidula, *Celtis*
spinosa, *Condalia*
Lycium berlandieri, *Berberis*,

Baileya? *Yucca*,
Ganthoxylum bagana, etc.

Near Max Trap Pens
first an enormous old boar
peccary crossed road
and disappeared into thick
thorn scrub. Then a medium
sized one was seen ambling
through thin low thorn scrub.

In La Bolsa the ground
is low and black. Open
forest of rounded *Celtis*
trees to 4.5 m. tall. Patches
of the open *Acacia farnesiana*
about 4 m. With the
large *Celtis reticulata* are
small trees of *Celtis spinosa*.
Large *Opuntia lindheimeri*
common. (photos - b.v.w. + Kod
of this area) Some *Acacia*
rigida.

Tight wire bridge - a
single cable with 2 hand
wires, suspended across Aransas R.
(Kod.)

Patches of *Aster spinosus*,
a leafless broom-like shrub
1 m. tall, in low spots.
(photos - b.v.w.)

14

1964 Texas

Jan. 20 Welder Wildlife Refuge
Tule Bend, Aransas R.

in semi-evergreen thorn scrub

244667 67 Aster ^{black}
on bare clay soil, along road.

12 68 Atriplex
common on bare black clay soil
along road

14 69 Missadula holosericea (Schoen.) Pache
common in very small opening

2 70 Baccharis
abundant locally

2 71 Lycurium berlandieri
occasional

Jan. 20 - Welder Wildlife Refuge
e. of La Boca, Aransas River

72 Aster spinosus
pure stand in low place.

Jan. 20 - Welder Wildlife Refuge

on roadside on dark clay soil

73 common

15

dish yellow, rays pale lavender,
prostrate, gray-green,
stems reddish.

branched at base 0.4 - 0.7 m. tall.
shrubs 0.5 - 1 m. tall.
- dish greenish yellow, rays white.
rigidly branched
shrub 0.8 m. tall. fruits
turning red.

broom-like, leafless shrub
0.1 m. tall.

prostrate

Jan. 20 - Welder W. S. Refuge

narrow below Rincon
Tanks - area of semi-
evergreen thorn-scrub,
open to closed, with
some small *Celtis* trees
in and along edges
of ravine.

Near Lagarto ^{Windmill} ~~Falls~~
is an area of minutely
rolling or hummocky
ground - dark clay loam
soil, with patches
of dwarf thorn scrub -
Prosopis - *Opuntia*,
patches of taller thorn
scrub. small depressions
no evident pattern
except that the earth
may have accumulated
around the scrub.

Short grass between
the scrub patches, esp.
on the elevations. Mud
less so in the depressions.
Fast rabbit seen here.

Several groups of 3
little brown cranes flushed
during the afternoon.

Mail - Pine Island!

Off Galapagos Expedition
Off U.S.S. Pine Island

AV

FPO San Francisco

18

1964 Texas

Jan. 21 - air trip Houston, Texas to Guatemala City.

DC-8, rt. side back of wing.

10:35 left Houston airport.

Cultivated land but with conspicuous gallery forest, locally deciduous, locally evergreen, along meandering streams.

10:39 Some blocks are pastures, some cultivated. Much burned over grassland.

10:41 Mostly dry pasture.

Then salt marsh lining a coastal lagoon, enclosed by a barrier beach.

Course turned rt. to follow coast.

10:43 A shipping canal follows inner edge of lagoon.

Several small subdivisions on barrier beach island.

10:44 Visibility almost none.

We seem to be following the coast just off the barrier beach.

11:44 Plain, largely but not entirely cultivated.

several large lakes

11:45 and a large meandering river with general course from about 45° to it of our course.

11:46 apparently swampy

Mexico

19

land along small meandering stream. Then a large patch of woods that seems hilly - several such, with broad cleared partly cultivated land between them.

11:49

Country generally cleared mostly pasture (brown) but large irregular angular patches of forest. Some hilly areas badly eroded. Small very meandering stream at angle, about 60° back, from course.

11:51

Country becomes hilly, but hills mostly denuded. Fine patchwork of shifting agriculture. Rugged mts. in distance.

11:53

Very rugged mts. with knob-like peaks and deep canyon-like valleys. Appears to be last remnants of a dissected plateau. Highest areas are forested, slopes all denuded by shifting agriculture.

11:54

Sharp ridges with roads or paths on tops, steeper slopes wooded, mostly shifting agriculture. Dissected plateau, flatter tract denuded, some scrub developed.

11:55

- 11:57 Plateau became arid,
grass or thin brush,
cut by deep jagged
canyons, trending
back from coast at
about 45°.
- 11:59 Plateau mostly pasture
a little cultivation.
some very eroded areas
steeper slopes very
brushy.
- 12:00 Very rugged mts.
seriously eroded,
parts are still densely
wooded, but only most
rugged parts, these
with granite pinnacles
protruding. Cleared
areas are mostly just
great erosion scars.
- 12:01 The central basin-
like plateau, with a
fair sized city
savanna landscape.
Flat cultivated areas.
low mound-like dark
hills. Uncultivated
areas are mostly grassy
with scattered trees.
These are the hilly parts.
Vast flat valley bottoms
are all cultivated.
Thinly wooded low
mountain in middle and
- 12:04

12:05

12:06

12:07

12:08

12:12

- far distance to right.
Around villages, roads
and field boundaries
marked by hedges.
Landscape tawny.
Areas of green large scale
planting (sugar?), brown
cultivated land, some
orchard (citrus?), pasture
with scattered trees.
Hedges conspicuous near
villages.
- Large area of savanna,
partly in apparently non
relands.
- Then large area of pasture
without trees.
Circling for landing.
- Vast spirally divided
ponds - green. What is this?
Then apparently saline
dry flats with no vegetation.
a lake bottom, I guess. Then
considerable area covered
by water, this very shallow.
Continues to near airfield
over vast marshes with
brown grass and patches
of red, ponds covered by
green vegetation.
- Landed.
- In garden at terminal two great
Phytolacca dioica(?) with enormous
swollen bases 2-3 m. across.

- 1:07 ~~Fox~~ left Mexico City airport.
Circled over large lake
and alkali flat.
Gentle slopes around it
cultivated, in places terraced.
- 1:10 A string of cones with
craters extending to right.
Eroded ash beds almost
like stairs at their bases.
- 1:11 Flat area intensively
cultivated. The small
fields lined by hedges.
- 1:12 Higher open forested
country, with many
small cones with craters.
The slopes wooded,
bottoms of craters and
some flat areas between
~~wooded~~ grassy.
- 1:13 Flat country, cult.
with mountain
ranges, some rugged.
They thinly wooded.
Valley bottoms flat,
cultivated-green (sugarcane?)
- 1:14 Several lakes in distance.
Country generally brown.
High rough mts. beyond
lakes.
- 1:15 Changed course sharply
to left.
- 1:16 Hilly denuded country,
hilltops and ridges

1:25

1:30

1:34

1:35

1:37

generally bare, some brush
in ravines and on steep
slopes. This very extensive.
Ridges generally rather
flat-topped.

This landscape continues
for some time, the contrast
between wood and bare
ridges becoming sharper.
Several wide treeless
valleys separated
by wooded ranges.
Same pattern of bare
ridges and wooded
ravines.

Then a large wooded
mountainous area.
Bare eroded hilly
country, reddish-tan,
around a compact little
city.

Low mts. to south of it.
dark, apparently scrub-
covered. Flat intensively
cultivated land around
them. Mountain irregularly
distributed, becoming
higher, rougher, more
forested. Lower land
cultivated or, where
hilly, eroded.
Valleys smaller & little or
no flat ground, slopes denuded,

- summits scrub covered
or wooded.
- Then thinly wooded
mountains, ridges
mostly bare.
Course is now more to
east.
Mountains becoming
more rugged.
- Many cleared patches
on mts. even a village
on a high ridge.
- A stream, mostly dry,
cuts through mts
about perpendicular
to course, conspicuous
light sandy bed.
They high rugged
mts. more densely
wooded in upper parts.
Lower parts with bare
ridges thinner woods.
several fires
- Course follows a stream
bed. These sandy,
dry or partly dry beds
stand out against the
brushy slopes.
- Stream empties into a
large lake or reservoir
with three arms.
Mountains around it
with tops denuded,
grassy or eroded.

1:45

1:46

1:47

- Large braided stream
bed from reservoir
parallels course in
middle distance, slightly
diverging from it.
Stream enters sea
on a strongly cuspate
coast, curve hooked
to left (s.e.?)
- A large lagoon enclosed
by a broad barrier beach.
Back of this a flat
cultivated plain.
Small steep islands
in lagoon.
- An arcuate inner
bar almost parallel
barrier beach ~~for~~ almost
full length of lagoon,
connect with a larger
island which is separated
from a mountainous
peninsula by a small deep
channel. Then another large
lagoon. The barrier beach
cut by some shallow channels,
then broadens enormously,
enclosing a series of small
shallow lagons. Some
shifted agriculture on
this barrier beach, but
mostly brushy. Inner side
in places curiously striate,
perpendicular to lagoon shore.

1:52 This merges with a coast with extensive dry lagons or bare flats, with a wooded barrier beach; then more lagons. Barrier beach is wide and bushy, with occasional roads from lagoon to sea. Vegetation more or less banded longitudinally. Lagons become more complicated with numerous small flat islands.

Then we left coast, out to sea.

2:07 Cut a long straight coast at a very small angle. Beach with large swamp. This pinches out, replaced by flat plain, partly cultivated, partly savannas and abundant patches of forest, mostly very small. This plain is quite wide, cut by many streams flowing toward ocean. Now becomes hilly, with more forest, but still largely cleared. Gradually more wooded. Clouds.

2:11

2:12

- 2:14 A slightly complicated top of a volcano protruding from clouds, wooded to top, but ~~summit~~ vegetation a bit thin and scrubby. A grassy area on one side below summit.
- 2:17 A deep valley with terrace and another steep cone with no crater, wooded to top but not on lower slopes, a deep blue lake.
- 2:18 Then two perfect cones, again wooded to tops. Lower slopes bare.
- 2:20 Plateau with cliffs to lake.
- 2:21 Deep gorge-like valley. Then dissected plateau, most of top clear, gorges wooded. Then ahead two much higher cones and a bit to left another.
- 2:22 Terrace top cleared, with windbreak, valleys + steep slopes forested.
- Then hilly brown country. Another volcano ahead. Most of hilly area clear but some with scattered trees, some patches of forest, then a dissected mt. and a large area of forest around a town.
- 2:24

- 7.25 More wooded mts.
lower slopes clear
with radial wooded
canyons.
Circling to land.
Large irregular volcano,
top apparently blown
out, in distance.
Flat cultivated land.
Lake beyond escarpment.
Some sugar cane.
Flat tops cultivated,
some in orchards.
Ravine walls with
thickets & open scrub.
landed.
- 7.27 Jan. 21 - flight Guatemala City
to Panama left side of Boeing.

- 4:15 Took off.
Some open forest - no shade trees
for coffee, on terrace tops. also in flat
canyon bottoms. Some of lower
terrace tops open grassland
steep, almost vertical
walls are wooded.
4:19 Very dissected land, no
flat ridge tops. Slope largely
wooded, much of wood
could be coffee plantation.
Clouds.
4:21 Valley V shaped, about 45° slope,
some bars, mostly wooded
but rather thinly.

- 4:22 Hilly country, largely denuded,
many tiny bits of wood.
Where hills are higher
ravines are wooded at
least in bottoms. Country
varies from a reddish
to grayish-tawny. Much
old erosion, some bedrock
exposed. Soil reddish,
bedrock light gray to buff.
Perfect little cone with tiny
crater in top, top $\frac{1}{3}$ wooded,
in middle distance, directly
abeam, another less well
preserved farther away
and a bit back.
Country a bit more rugged.
small town and considerable
forest between it and course.
Beyond it ~~abut~~ is direction
of course, some curious
very finely dissected country.
Then a series of parallel
ridges and ravines 45° from
course, running to an escarpment
directly on course.
Country more irregular,
broad valleys, a large very
dissected mt. mass. and
a low smooth cone. Then
some finely dissected land
about as 45° , thinly wooded pattern
very fine.
4:27 High abrupt volcanos, wooded.

- 4:33 A river crossing course
- 4:35 A clump of volcanoes, wooded, one with a large breached crater with a village in it.
- 4:37 The last one in the clump is a fresh perfect cone with a sharp crater in the top, bare slope $\frac{1}{4}$ to $\frac{1}{2}$ way down some forest below. This must have erupted recently.
- 4:38 A lake and sharp denuded mountains between it and course.
- Then the ocean - beach straight, at a very slight angle away from course, ending in a peninsula in direction of course, encloses a bay with many islands. These mountainous, largely bare, but some bushy slopes.
- 4:40 A large volcano on ~~a peninsula~~^{peninsula} with a beautiful breached spot pointing toward bay.
- This volcano has a great sharp crater apparently very fresh, with sharp rim, the outside bare and red, but only for a short distance down, sharp boundary with forests.

Head of bay enclosed by this peninsula is a maze of mangrove-lined tidal channels in an extensive bar flat with about 3 rivers winding through it.

Bet. this and course wooded hills, some peaks bare.

The bar flats extend well up the rivers, but uppermost reaches look like marsh, rather than bar soil.

Row of peaks along course look volcanic, but clouds obscure them somewhat.

Upper slopes cut by ravines, partly bare.

Clump of small volcanoes, one of them bare and fresh, crater smoking a bit, very sharp. Others still have craters but a bit worn down, some bare or grassy slopes, some wood on upper slopes, lower part wooded.

A tiny, perfect, dead black cone with a crater. Then several other somewhat larger cones with craters, tawny & partly wooded. A number of these, and a larger one.

Nearagua

- bare and red brown ~~at~~ in upper parts - quite fresh.
Then complete cloud cover.
- 4:51 Crossed coast. sea is clear but land covered by clouds.
- 4:55 A peninsula mostly bare but with a small bay with mangrove swamp.
- 4:56 Several small islands out from coast, high, mostly bare or grassy.
- 4:57 Land in distance largely brown grass except for some wood or mangrove along shore.
- 5:01 Visibility poor.
- 5:02 Coast in distance looks like small very irregular green island just to left of course.
- 5:03 Coast coming closer, but haze rather thick.
- 5:04 Some mangrove along coast, especially in bays and around ~~one~~ stream mouths.
- 5:05 Mostly flattened land, but visibility very poor.
- 5:06 Wooded from here on becomes ~~at~~ a bit hilly with a rather fine close pattern. More mountainous in distance.
- 5:07 No evidence of shifting ag.
- 5:08 A large river winding off about 45° from course to left, splitting into

- 5:13 Distributaries and entering sea through a vast delta.
- Clouds.
- 5:17 Crossed coast at a very small angle.
- 5:39 Crossed coast again, at about a 45° angle left of course.
- Getting too dark to see any details.

Jan 22 - left Panama 7 a.m.
arr. Seymour I. 10:15 a.m. (C 30)

Seymour I. - Low cliffs
near harbor. -

Colletia sp. occasional on
rocks and talus - a green
almost leafless "holocanthos"
low diffusely branched shrub.
Also common a brown spiny
spinose leafless bush,
a *Ceanothus* (?), and a shrub
with fleshy alternate
leaves minute green fls
with prominent disk in
axillary pulvini. A single
individual of what
appears to be a *Jatropha*,
occasional arborescent *Opuntia*.
A few small *Purshia*
acerifolia much completely
dry grass. Lichens on
several of the shrubs.
Rock is a volcano breccia.

Tidal flat back of
beach - soil with coarse
gray blown-in on it.

Purshia *acerifolia* scattered.
Commelinaceae 2
Desmodium *montanum*
The *Desmodium* forming
small mats in sand with the
Commelinaceae mats & low tangles.

slightly higher up
the *Purshia* on sand
blown in, probably seldom
covered by tide.

Beach ridge across head
of bay.

Hedysarum canescens
holding hummocks of sand
near one end. *Coldenia* sp.
dead, also common.

In center of beach,
a ~~the~~ Hippocratea bush.
The thick leaved *Elaeagnaceae*
fairly common. Also
Commelinaceae and *Colletia*
near center of head of
bay, extending
along boulder ridge toward
other side.

Beyond center is a remnant
of what looks like elevated
beach, perhaps 2 m. above
surface very pitted and
sharp. Much volcanic
rock interbedded, so it
may well be lacustris.
Very difficult to break.

The remnant is about
25 m long and
much eroded gray color
(sample 1).

Another piece of broken
beach rock, reddish, differentiated
in sand (white).

Curly, golden plowrs?
Brown pelicans, frigate
birds, sea lions

Dozens of green tortoises
bored on sandy beach
edge.

Flight Seymour to Academy
Bay - Broad plain on Santa
Cruz covered by a somewhat
open forest of Bursera?
completely bare, branches
white. A few trees rather
inland are beginning to
turn green.

Another zone dominated
by Psidium, and one
dominated by Lealesia.

On the slope ~~of~~ above
Academy Bay several
clearings and dwellings.

Opuntia in all the types
except the Bursera zone.

Around Academy Bay
Village Cappocarpas is
dominant plant.

Academy Bay
Exotic plants
Ricinus communis
Ficus carica
Canna sp. spad.
Gathraanthus roseus
Passiflora foetida var. *terpsichore*
Annona cherimolia
Phoenicea dactylofera
Messersia involucrata
Terminalia catappa
Mangavea spectabilis
Aloe sp. of vera
Cynodon dactylon
Forsternum
Zizaniopsis hybrid
Canna sp. hybrid
Portulaca grandiflora
Mesembrianthemum
Solanum lycopersicum
Pelargonium zonale
Agave.
Lorchnus
Amaranthus
Vitis vinifera
Rhus sphaerocarpa
Datura (Brugmansia) sp.
Plantago
Momordica charantia
Ruellia cf. *longiflora*
Citrus *Citrus* *melo*
Cedrela *cedrela* *panamensis*
Yucca sp.

38 1964 . Galapagos Is.

Jan. 22 - Seymour Islands

~~along~~ around bay where

sea plane ramp is located
Maytenus octogona (L'Her.) DC. is located

44674 Maytenus obovatus det. A.M. Porter 11/12/69

common in beach ridge

5 75 Maytenus octogona (L'Her.) DC. 11/12/69

~~common~~ occasional on
low beach cliff.

5 76 (lichen)

on twigs of bare bush

77 lichen on twigs of bare bush

5 77 (lichen)

on twigs of bare bush

78 ~~Casuarina~~

5 79 Parkinsonia aculeata L.

common on flat just
above high tide

5 79 Sesuvium portulacastrum var.

(very local on tidal mud flat)

Sesuvium Edmonstonei Hook. f. Det. A.M. Porter, 1975.

5 80 Cryptocarpus pyriformis HBK.

abundant locally,
on tidal flats (also seen
on higher rocky ground
and on sand)

1-5 m.

Seymour (Baltra) ?

39

shrub 3 m. tall, densely
branched; flowers green
irregularly branched
bush, leaves stiff,
fleshy, brittle, flowers green.

shrub 3 m. tall, widely
spreading. Flowers
yellow.

forming dense mats,
stems green, leaves fleshy,
dull, not strongly
compressed, erect,
flowers pink.

sprawling fleshy shrub,
flowers greenish.

Jan 23 - Academy Bay
 A tangled bank of
 Cryptocarpus and many
 other shrubs, mostly
 scattered tall Opuntia
 on flat ground back
 of high lava flow.

Where the ground
 begins to slope away
 there is a more or less
 open area, 3-5 m. tall of
 Croton, esp. Opuntia,
 also, Cryptocarpus,
 Conocarpus, Colletia, ~~Lantana~~, Maytenus

Little undergrowth and
 almost no herbs. This
 is on bare lava, very
 little soil even in pockets.
 Borrichia, Portulaca are
 occasional.

Cordia, Lantana and Gallesia (?)
 are occasional.

The Croton is just starting
 to put forth new leaves.

On rather lower lava
 near the fault scarp
 Cryptocarpus seems
 dominant, with few
 deciduous species. But
 the scrub is definitely
 open with the black
 lava showing between

the trees when looked at
 from the top of the scarp.
 Cocos is more abundant
 here than Opuntia, but
 the latter is still common.
 3 photos (bad) from cliff top.

Precipice of lava
 dominated by
 Cryptocarpus but
 with Croton, Bursera,
 Opuntia, Passiflora, Castilleja,
 Polypodium, and Pitcairnia
 rare in crevices.
 Lichens abundant
 on rocks and ~~so~~ on rocks
~~so~~

On top is a lava flat
 with some red soil in
 patches. This is covered
 by a scrub about 3 m. tall

of Cacti & fruit bearing
but, with scattered
Opuntia, to 10 m., and
occasional Euphorbia &
Aralia.

Some Paspalum & Maytenus.
The Cacti in open
area and forest, stone
or sand.

Locally Cirsium vulgare & Lathyrus
common in places
patched with scattered
small Maytenus. Areas
also goat-trimmed
dwarf shrubs of an
aromatic bandana type
esp. open places,
a seedling Opuntia, a
seedling Legume (Phaseoloid)
and Bougainvillea common
on ground esp. on
crevices & much dead wood.

Further up, where ground
slopes up again, Passiflora
is dominant, deciduous
scrub found about 7 m. tall
with liberal component
of Opuntia and some Coconuts
the same height
much dead wood.

Jan. 24 - Academy Bay
Lowland scrub -
dominated by Cryptocarpus
which forms tangles up
to 3+ m. deep. The
clumps are from 1 to 3
m. apart, many
stems and branches,
these to 5 or more m. long,
forming a continuous
tangle. Mixed with
this are scattered
tree Opuntia, large
shrubs of Maytenus,
occasional bushes
of Colletia, Castela
(Spineless), Fioelichia,
Alternanthera, and
very commonly, tall tree-like
shrubs of Croton scouleri,
these 3-4 m. tall, irregularly
distributed.

Locally there are groves
of Opuntia, and just
backs of the mangroves
groves of Hippocratea.

The Cryptocarpus tends
to climb over the Hippocratea
and form large mounds.

44

1964 Galapagos Is.

Jan. 23 Academy Bay

vicinity of seismological station
in open scrub forest
on basaltic lava rock44681 *Vallesia glabra* (Cav.) Link. (det. Anderson 1978)5 occasional in very
sparse undergrowth
on lowest slope, below
escarpment5- 82 *Prosopis dulcis* Kunth
(occasional on cliff
P. juliflora (Sw.) DC.5 83 *Castela galapageia* Hook.f.
rare on cliff5 84 *Polyphodium tridens* Kunze det. Porter 1974
rare in crevices on cliff5 85 *Corneliaea diffusa* Burm.f.
occasional on upper
ledges of cliff1 86 *Buergeria scandens* L.
occasional on ledges of cliff1 87 *Rosella*
local under overhanging
rocks on cliff.5 88 *Bursera graveolens* (HBK.) Tr. & Planch. det. D.M. Porter 1970
occasional on cliff1 89 malpighia?
local
occasional in open scrub1 90 Santana?
common in more open areas

Indefatigable? (Santa Cruz) 45

10-20 m.

↓
elongate, semi-scandent
lactiferous shrub. corolla limb white,
ripe fruit white, fleshyspreading, diffuse
shrub, flowers dull
cream, pods immature,
semi-scandent sprawling
small tree with arching
semi-scandent elongate
branches.rhizome prostrate,
much branched, stilt, thick,
yellow when broken,
prostrate, #

det. Porter

small tree, scarcely
leafed out, fruit immature,
sterile, intricately branched
shrub, herbage with a
slightly shrubby odor when broken.
aromatic, sterile, shrub
eaten down by goats.

46

1964 Galapagos Is

- 44691 *Croton scouleri* Hook. f. var. *scouleri*
 2 ~~in~~ det. D.M. Porter 1974
- 1 92 *Cordia lutea* Lam.
 occasional in inner
 more open part of terrace
- 5 93 *Evolvulus* common locally in
 crevices and pockets of
 soil
- 5 94 *Croton Evolvulus glaber* Spreng. (Det. P.M. Porter) shrub 3 m. tall.
 common on inner
 part of terrace
- 5 95 *Acacia macracantha* H. and B. exsiccata
 common on inner
 part of terrace in more open areas
- 6 96 *Boerhaavia scandens* L.
 common generally
 in crevices and pockets
 of soil
- 2 97 *Boerhaavia caribaea* Jacq. Det. D.M. Porter, 1975.
 rare in pockets of soil
- 1 98 *Desmodium* ^{Procumbens (Mill.) Hitchc.} var. *Procumbens*
 occasional in pockets of
 soil, in clearing.
- 5 99 *Portulaca oleracea* L.
 common in clearing
 rare in pockets of
 soil & in scrub

Indefatigable Is.

17

shrub 1.5 m. tall.

prostrate

(P.M. Porter) shrub 3 m. tall.

+4694: *Croton scouleri* Hook. f. var. *scouleri*
 det. D.M. Porter 1974flat-topped tree 4 m.
 tall, flowers orange.young shoots from
 heavy rootstocks,
 flowers pinkish.prostrate, leaves
 somewhat in one plane,
 fleshy.

48

1964 Galapagos Is.

Jan. 24 Academy Bay

1-2 m.

in lowland scrub
just back of mangrove zone.44700 *Tournefortia guineensis* Hook.f. (det. P.M. Porter)
5 very local5 01 *Heliotropium curassavicum* L.
locally common in
openings12^{DET.}_{PORTER} 02 ~~Zoobalanus~~? *Alternanthera filifolia* (Hoo Kf.) Howell
common in openings

0 m.

- same - in edge of
mangroves5 03 *Avicennia germinans* (L.) L.
rare det. Moldarke5 04 ^{Maytenus octogona (L.) Her.} *Maytenus obovata* DC. det. D.M. Porter 1/2/69
occasional5^{DET.}_{PORTER} 05 *Cryptocarpus pyriformis* HBK
abundant, dominant5 06 *Acacia implexa-wacoli* Rides
rare, on lava ridge5 07 *Collatia Santia paniculata* (Hook.f.) Weberb.
common5 08 *Alternanthera echinocephala*
common5 09 *Tournefortia pilostachya* HBK (det. S.M. Porter)
rare

1-3 m.

shrub 3 m. tall, leaves

thick, flowers green.

brittle, fleshy scandent

shrub, forming tangles.

shrub 2-3 m. tall spreading,
flowers deep orange yellow
fragrant

low rigidly and intricately

branched shrub, flowers yellow green
supporter herb 2 m. tall
heads dull whitescrub to 2 m. tall
with drooping elongate
branches white flowers.

Indefatigable Is.

49

Jan. 24 - Academy Bay
Mangrove zone.

Flora

- Rhizophora mangle* L.
- Avicennia officinalis* L.
- Laguncularia racemosa* ^{(L.) Gaertn.}
- Conocarpus erectus* L.
- Distichlis*
- Sesuvium portulacastrum* L.
- Ephorbia virginiana*
^{(L.) Kunth}

~~Total~~

The mangroves here grow on bare basalt rock where it slopes or forms terraces covered at high tide. Silt and sand accumulate around their roots whenever there is no rock debris to hold the mud. Along much of the shore in front of the mangroves are accumulations of broken rock with sand and silt covered back of the crest, by *Sesuvium* and *Ephorbia virginiana*. The seaward slopes of those boulder ridges are

inhabited by marine aquatics.

The mangrove fringe is generally quite narrow, locally *Laguncularia*, locally *Avicennia* dominant, with some admixture of *Rhizophora*.

Jan. 24 - back of Academy Bay, beginning of trail to ^{Bellavista} Horneman farm.

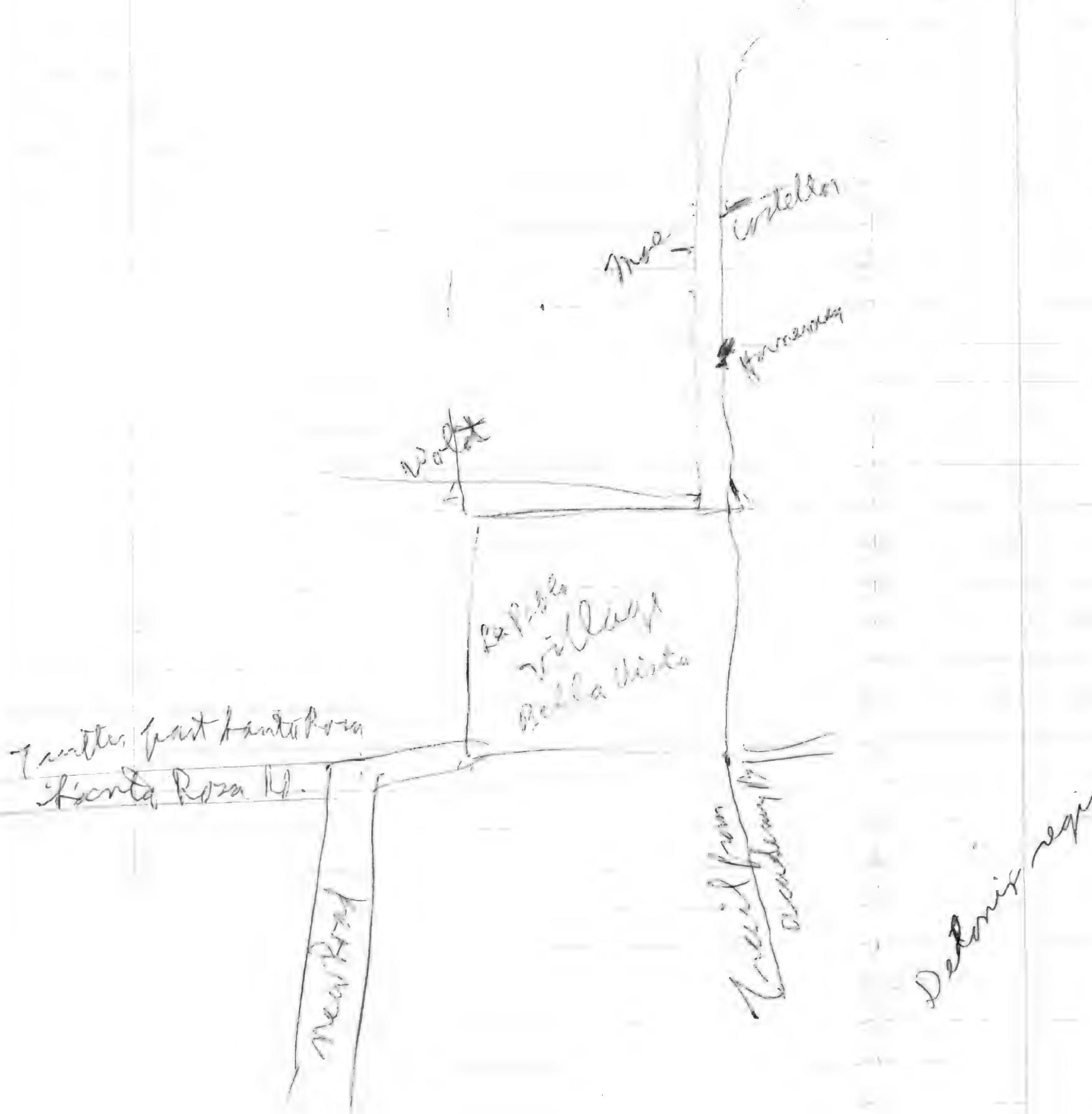
Castela

Open mixed scrub openness probably result of clearing - cut trees and stumps present - *Dioscorea*, *Cryptocarpus*, *Vallisneria*, *Acacia* 2 sub. *Zanthoxylum* un. *Cordia lutea*, *Cordia* sp., *Tournefortia*, R. with scattered trees - *Pisonia*, *Bursera*, *Pisocedia*, *Acacia*, *Opuntia*, *Parkinsonia* (?)

Where this has not been cleared it is an irregular - open to closed scrub ~~tree~~ forest, with the same composition but also with Maytens

In the cleared areas, in crevices and pockets of soil *Berberis*, *Bursera*, *B.* scandens, *Trianthema*, *Setaria*, *Passiflora*, *poetica*, *Portulaca*, *oleracea*, *Hormoea* sp., *Galactis*? *Abutilon* sp. are all common.

Cryptocarpus is spreading over this, thinly now.



(Indepatigable).

Exotic plants at Bella Vista

- Pritchardia pacifica*
- Cocos nucifera*
- Dillenia indica*
- Eugenia jambos*
- Musa sapientum*
- Sida acuta*
- Coffea arabica*
- Hibiscus cf. rosa-sinensis*
- Datura (Brugmansia) (salmon color)*
- Tectona grandis*
- Malvastrum coronandelianum*
- Eugenia malaccensis*
- Ananas comosus*
- Carica papaya*
- Ipomoea batatas*
- Cyperus alternifolius*
- Pereca americana*
- Propreolum orange*
- Rosa spp. (ornamental hybrids)*
- Pruina aspera?*
- Salvia occidentalis?*
- Nicotiana tabacum*
- Nerio?*
- Terminalia catappa*
- Gutrophora cana*
- Cyperus rotundus*
- Borreria*
- Sida acuta*
- Verbena littoralis*
- Elephantopus sp. spinatus*
- Paspalum conjugatum*
- Cyperus papyrus*
- Morinda citrifolia*

Jan. 24 - Academy Bay
lower part of trail to ~~the~~^{Bella} Vista
in xerophytic scrub on
bare lava rock

44710 *Clerodendrum mollissimum* HBK.

1 rare

1 11 *Boehmeria scandens* L.
common

1 12 *Capraria biflora* L.
occasional along trail.

1 13 *Sida spinosa* (det H. Andersen 1978)
occasional along trail

5 14 *Heliotropium angiospermum* Muell. (Pet. D.M. Porter) dwarf shrub.
rare, not far from shore

5 15 (grass) *Setaria setosa* (Sw.) Beauvo. det. D. M. Porter 1974
occasional in open areas

3 16 *Plumbago scandens* L. (det H. Andersen 1978)
occasional in open places

2 17 (legum) *Glabria velutinifolia* Benth.
occasional in open places

1 18 *Sporoea*
rare in open places

5 19 *Trianthema portulacastrum* L.
common in open places
in pockets of soil.

5 20 *Passiflora foetida* L. var. *galapagensis* (det. P.M. Porter)
common in disturbed places

5 21 *Abutilon deparatum* (Hook. f.) Andersen ex Rob. (Pet. P.M. Porter)
common in open places

8 22 *Pisonia floribunda* Hook. f.
one tree seen

5 23 *Cordia*
rare

scandent shrub; sterile.

elongate herb, leaves
green beneath

dwarf shrub.

erect tufts

flowers white.

twinning over bushes

flowers rose purple, closed
in late afternoon
leaves thin, fleshy.

prostrate and climbing
stems from central root
crown.

flowers pale orange, petals
narrow, separated.

tree with strongly ascending
branches, fruit from ground.

58 1964 Galapagos I.

- 44724 *Acacia macracantha* H. and B. Willd ex.
common
- 2 25 *Vallisneria glabra* (Cav.) Link (det. Andersen 1978)
common
- 1 26 *Tournefortia pubescens* Hook. f. (Pet. D.M. Porter)
occasional
- 1 27 *Acacia insulicola* - var. *racemosa* Rides
common
- 1 28 *Tamarindus*? *Prosopis juliflora*
(S.W.) DC.
rare, near dwelling
- 1 29 (legum) *Piscidia carthagenensis* Jacq.
common
- 2 30 *Chirococcus alba* (L.) Hitch.
occasional
- 1 31 *Vallisneria glabra* (Cav.) Link (det. Andersen 1978)
common
- 5 32 *Poerharia caribaea* Jacq. Pet. M. Porter, 1975
very common on bare
lava rock, especially in open places.
- 8 33 *Cordia lutea* Lam.
common
- 1 34 *Cryptocarpus*
abundant

Jan. 25 - Academy Bay
a muddy flat just back
of rocky shore, wet by
sea water at high tide

- 6 35 *Aporobolus virginicus* (L.) Kunth
abundant

Indefatigable (Santa Cruz) 59?

- small spreading
- flat-topped tree; flowers orange.
- shrub 2 m. long, spreading,
lactiferous; flowers white.
- shrub 2 m. tall;
- flowers white.
- shrub 2.5 m. tall.
- small tree 3 m. tall, nearly
flat topped.
- shrub 2 m. tall (others
seen tree size); sterile.
- shrub 2 m. tall.
- weak shrub; flowers white.
- branched from base,
branches ascending,
- branched in one plane.
- shrub 3 m. tall,
corollas bright yellow,
ripe fruit white, fleshy.
- specimen to show
rooting of prostrate stems.

1 m.

forming a thick sod.

Jan. 25 - Trail to Horne曼
Farm from Academy Bay,
near La Bahia ~~on the road to~~
Open & closed scrub
forest on lava - much
Opuntia (photos hor. 180° w.)
This seems to be about
the beginning of the
transition point. It would
be an open scrub forest
about 3 m. tall, mixed
Cassia and Opuntia with
a dense tall scrub
layer of Zanthoxylum,
Cyclachaena, Eclipta,
Elaeagnus, Malvastrum,
and a few short layers
of Abutilon, Cyathula, etc.
Ipomoea spp., Chilacasia,
Gelasia, C. macrorhiza,
Prosopis in scattered,
Alternanthera, Achyranthes,
etc.

Beyond the ~~transition~~
the forest becomes a bit
denser. (Photos from red)
One Opuntia about 7 ft. tall
measured, d. 8 ft., 180 cm. gall. l. b. w.
Acacia common & large
layer with a prominent
tree layer more irregular
layers.

Above precipice called
La Tiranera the forest
becomes closed and
taller up to 12-15 m.
still some Opuntia.
Trees draped over
some trees
(photos - dor w.)

From top of precipice to
Hornemann place (at 600')
the vegetation gradually
assumes a more and
more mesophytic aspect,
becomes denser, less
species are deciduous,
composition becomes richer,
Lisonia becomes abundant,
Opuntia disappears.

Around Bella Vista
the vegetation is degraded
and disturbed, mostly
a tangled secondary
scrub.

62 1964 - Galapagos Is.

Jan. 25 - trail from Academy Bay to Bella Vista (La Fortuna)
near first large fault crack
in open scrub-forest,
~~occasional~~ in pockets of soil
and crevices in lava rock

- 44736 *Ipomoea*
occasional
1 37 *Heliotropium angiospermum* Muell. (det. D.M. Porter)
occasional
1 38 *Fleurya aestuans* Gaud.
rare in crevices
5 39 *Ipomoea*
common
1 40 *Mentzelia aspera* L.
rare in crevice

same between the two
faults.
in open scrub forest on
lava rock.

- 5 41 *Acacia xanthina* Christoph.
occasional

- 5 42 *Malvastrum coccineum*
common locally in pockets of soil.

- 1 43 *Chrozocera alba* (L.) Hitchc.
~~shrub 1.5 m. tall~~

- 3 44 *Croton scouleri* Hook.f. var. *scouleri*
~~shrub 1.5 m. tall~~ common

- 2 45 *Amaranthus*
occasional in pockets of soil

- 1 46 *Sentis paniculata* (Hook.f.) Weberb.
common

Indefatigable I.

63

25 m

creeping, flowers pink.

flowers white, with
yellowish eye.

creeping, flowers white.

40-50 m

small spreading tree
4 m. tall, flowers orange,
fragrant.

shrub 1.5 m. tall.

shrub 1.5 m. tall
7 det. D.M. Porter 1974

shrub 0.7 m. tall, stems
green, stiff.

64

1964 Galapagos Is.

- 44747 *Sida spinosa* L.
occasional
- 5 48 *Panicum fasciculatum* Sw. det. D.M. Porter - 1974
common
- 2 49 *Boerhaavia caribaea* Jacq. det. D.M. Porter - 1975
common
- 5 50 *Euphorbia chamaesyce ophthalmica* (Pers.) Burch (det. H. Andersen 1978)
common locally
- 1 51 *Chisocoma alba* (L.) Hitchc.
occasional
- 1 52 *Heliotropium angiospermum* Murr. (det. D.M. Porter)
common
- 5 53 *Heliotropium angiospermum* Murr. (det. D.M. Porter)
~~or~~ rare variant
- 5 54 *Plumbago scandens* L.
occasional, in full sun.
- 1 55 *Cyperus*
rare, in crevices in lava
- 2 55a *Cendruus platyacanthus* Anders. det. D.M. Porter 1974
occasional
same: near foot of
precipice
- 5 56 *Tournefortia pubescens* Hook. f. (det. H. Andersen 1978)
rare
- 5 57 *Tribulus cistoides* L.
rare, in full sun
- 3 58 *Capraria biflora* L.
common, in trail
- 1 59 *Justicia*
rare
- 5 60 *Tournefortia pubescens* Hook. f. (det. S.M. Porter)
occasional

Indefatigable I.

65

- spreading tufts
- spreading to prostrate,
flowers deep rose.
- erect shrub 1.5 m. tall,
buds white.
- flowers white,
eye yellowish.
- ~~fls~~ loosely branching
branches ascending,
flowers white.
- plant prostrate with
ascending branches,
deep purple; petals white,
rather narrow.
- spreading culms.
- culms ascending to erect.
- shrub 1.5 m. tall,
flowers white.
- prostrate, stems
radiating from root crown.
- flowers white.
- shrub 2 m. tall;
flowers white.

66 1964 Galapagos Is.

- 44761 *Tournefortia rupestris* Hook. f. (det. D. M. Porter)
5 occasional
- ^{det. 1975}
^{Porter 1975} 5062 *Alternanthera halimifolia* (Lam.) Standl.
rare at this altitude
- 10 63 *Alternanthera filifolia* (Hook. f.) Howell.
locally common

Jan. 26 - trail between
Bella Vista and abandoned
village of Ponce Enrique
disturbed mossy forest

- 5 64 *Asplenium nidus* L. var. *nigropurpureum* (L.) Moore
epiphytic
- 1 65 *Coryza canadensis*
in ~~the~~ weedy clearings
- 3 66 *Sonchus*
in weedy
- 2 67 *Nephrolepis cordifolia* (L.) Presl det. Porter 1974
on fallen log
- 5 68 (comp.) *Adenostemma lavenia* (L.) Kunze
occasional along trail
- 5 69 *Psychotria nigriflora* Hook. f.
abundant in undergrowth
- 1 70 *Fleurya aestuans* Gaud.
common along trail
- 3 71 *Urena caracasana* (Jacq.) Griseb. (det. Andersen
1978)
rare in undergrowth
- 2 72 *Cordia*
rare in undergrowth
- 2 73 *Cordia*?
rare

Indefatigable?

67

- shrub 1.5 m. tall,
flowers white; ripe
fruit white, fleshy.
- plant spreading,
depressed.
- much branched.

600'
200 m.

Holc. West H.

flowers yellow.

- large much branched
herb with thick stem, 0.7 m. tall
flowers white
- shrub with green stem,
1.5 m. tall, fruit red, fleshy
- flowers white
- stinging herb, stems
reddish.
- shrub 2 m. tall, sparsely
branched, inflorescences
on bare stems below leaves.
- shrub 2-3 m. tall
- tree 4 m. tall, gnarled.

(to p. 74)

Jan. 26 - trail between
 La Cooperativa ^{Camilo} ~~to~~ Bella Vista and
 Ponce Enriques (abandoned
 colony).

The general vegetation
 is a degraded *Scallesia*
 forest, quite open, the crown
 touching only in places.
 Some areas have a strong
 admixture of *Psidium*
galapagense and *Zanthoxylum*
fagara, or only
 the latter, in places
 dominant, with either
 few or no *Scallesia*. The
 trees are 10 m. or more tall,
 especially the *Scallesia*.
 The *Scallesia* have
 straight bare trunks
 and an umbrella-shaped
 crown, fully leafy. The
Zanthoxylum and its
Psidium are gnarled,
 diffusely branched and
 spreading, sparsely
 leafed, and covered by
 festoons of a hanging
 dark brown moss. Here
 and there are cleared places.
 The whole has a deep
 layer of herbaceous
 or subshrubby undergrowth,
 thin thick and about 2 m. or
 more tall.

The ground is a dark
 soil, deep in pockets,
 rock showing through
 in others.

This vegetation seems
 to have suffered from
 the depredations of
 log cutters, wild cattle,
 wild hogs, donkeys etc.

Apparently this herbaceous
 undergrowth appears
 very rapidly in the
 wet season, and
 dies to the ground in
 the dry season (except
 probably the abundant
Psychothoria.

—

Jan. 26 - trail between
 Ponce Enriques and
 "Table Mountain" (Los
 Negritos).

This runs through
 less disturbed forest,
 partly an extremely
 mossy *Psidium*-
Zanthoxylum open
 gnarled forest with
 a deep herbaceous
 + sub-shrubby under-
 growth. The trees are
 spreading and not
 very leafy, spaced

up to the ~~base~~ width of the crowns, in places the crowns touching.

Parts of this trail go through areas of *Scallesia* forest varying from open to closed. The trees tall, bare to the umbrella-shaped crowns, which are light green.

Areas where the *Scallesia* has been cut or destroyed in some way are producing thick crops of *Scallesia* saplings.

The *Zanthoxylum* and *Psidium* are swathed in masses of hanging moss, yellow-green to dark brown. The undergrowth is from 2 to 3 m. deep. *Pithecellobium* is very common. The rest is of fast growing herbs.

(photos)

Near the grass-topped hill called Table Mountain are rather extensive open meadows, with intricate series of low rolling hummocks, with shallow pools of water between them - the

hilltops and depressions covering about half and half of the ~~area~~ open areas. The grass seems to be largely *Stenotaphrum secundatum* or some similar wide-leaved stiff low grass, some *Paspalum conjugatum*, and abundant sedges - *Crochans*, *Dichromena*, *Lippia*, etc., also abundant *Alternanthera* (reddish, pubescent), and *Cuphea carthagenensis*. The water is mostly covered by a thick layer of bright red *Azolla*.

This is the "Tortoise country" of Stevenson. Several large tortoises were seen, grazing on the grass and herbs. (photos) It is surrounded on the sides away from the hill by *Scallesia* forest (photos) and on the side toward the hill by a scrub of *Eriogon* sp. ?, forest of *Croton* sp. which extends up the hill, and *Scallesia* forest. Top of hill is grassy. (photos)

The "Tortoise country" is rather extensive and usually in long, rolling openings, with *Scelotes* forest and *Psidium* between them. This combination extends north or northwest to a tremendous collapse crater several hundred yards across and 400-600 ft deep. Upper walls are vertical talus below. A grassy spot occupies the center of the bottom, and this covers the talus and such parts of the side as are not quite vertical. (Talatos).

Bella Vista - exotic plants
Ochnoma pyramidale
Panicum maximum
Cymbopogon nardus
Colocasia esculenta
Mambot ~~esculenta~~
Xanthosoma sagittifolium
Jatropha curcas
Croton variegatum
Bambusa multiplex
Ricinus communis
Solanum tuberosum
Saccharum officinarum
Pithecellobium
Gymnocallis littoralis
Ipomoea batatas
Eclipta alba
Actinidia propinquia
Psidium guajava
Elaeis indica
Mangifera indica
Inga sp.

74

1964 Galapagos Is.

(ctd. from p. 66)

- 44774 *Solanum nigrum* L.
3 common in ~~abandoned~~ clearing
7 75 *Asplenium auritum* var. *auritulum*
epiphytic
1 76 *Polyphodium steirolepis* C. Chr. det. Porter
epiphytic
3 77 *Pleuropetalum derwinii* Hook. f. det. H. v.d.
occasional along trail
6 78 *Galium galapagoensis* Wigg.
very local, one tangled
colony in old clearing

Jan. 26 - Trail between Once
Enrique (abandoned village) and
"Table Mountain" (for Negritos)
"Tortoise country".

in ~~the~~ rather degraded
mossy ~~forest~~ forest

- 2 79 (fern) *Dennstaedtia globulifera* (Poir.) Hieron
occasional
1 80 *Nephrolepis cordifolia* (L.) Presl det. Porter
epiphytic
2 81 *Spermacoce suffrutescens* Jacq. (det. H. Andersen 1978)
abundant in herbaceous
undergrowth
5 83 *Phoradendron*
common, parasitic on
Zanthoxylum pagana (L.) Sarg.
2 84 (solan.)
rare
2 85 *Solanum nigrum* L.
common ~~in~~ along trail
2 86 *Spermacoce suffrutescens* Jacq. (det. H. Andersen 1978)
common in trail

(Hoch. f.)
Morton & Lettinger det. Parks

1974

Werff

det. date

no -
200 m

Ineffatigable I.

75

much branched sprawling
herb, flowers white.

Lettinger det. Parks

shrub, 1 m. tall; inflorescence
red, calyx orange.
tangled mass, steril;
(could have come from RioBambos
with colonists).

bronde almost erect, 2 m.
tall, from erect rhizome.

stems red, flowers
white.

stems erect, 1 m. tall, several
from base; fruit whitish,
translucent.

shrub 1 m. tall, buds

white, fruit immature.

much branched herb,

flowers white.

with # 44781, but corolla half as
large, stems green, flowers white.

- 44787 *Polyphodium lanceolatum* L. det. Porter
1 epiphytic 1974
- 5 88 *Holanum migrans* L.
rare along trail in opening
- 6 89 ~~Trevoza~~ *Mecardonia diathera* (Sw.) Penell det. Porter
abundant along trail
- 5 90 *Chlorochea alba* (L.) Hitchc. 1
rare
- 3 91 *Epidendrum spicatum* Hook. f.
~~was~~ rare, epiphytic
- 5 92 *Jaegeria crassa* Torres det. Porter
abundant along trail
- 1 93 *Asplenium cristatum* (Lam.) det. Porter
terrestrial
- 4 94 *Pilea baurii* Robins (det. H. Andersen) 1978
common
- 2 95 *Psychotria rufigera* Hook. f.
abundant in undergrowth
- 4 96 *Doryopteris pedata* var. *palmata* (Willd.)
common, terrestrial.
- 5 97 *Psychotria rufigera* Hook. f.
abundant in undergrowth
- 5 98 *Psychotria rufigera* Hook. f.
abundant in undergrowth

Jan. 26 - "Tortoise Country"
near hill called "Table Mountain"
or "Los Negritos"
in ~~an~~ open meadows
with wet depressions

- fronds leathery
much-branched compact
bushy herb, m. tall
- flowers white
prostrate, flowers yellow.
said to have been recently
introduced but to have
spread very rapidly.
shrub or small tree 4m
tall, branches elongated,
subscandent.
flowers yellowish,
mostly seen fruiting
flowers yellow.
- stems thick, translucent,
juicy, edible.
shrub 1.5 m tall, flowers
white.
- Hicken det. Porter 1974
shrub 2 m. tall, flowers
white, fruit red, fleshy.
shrub 1.5 m. tall, flowers
white, fruit immature.

78 1964 Galapagos Is.

- 44799 5 Dichromena common Rhynchospora nervosa subsp. (M. Vahl) T. Koyama det. D. M. Porter 1974 ciliata
- 3 800 3 Ageratum conyzoides L. abundant
- 2 '01 2 Spilanthes acmella (L.) Murr. occasional
in edges of wood
- 5 02 (malo.) 5 Anoda gacevifolia DC. (Det. D.M. Porter)
common
- 5 03 (cumb.) 5 Elaterium carthaginense Jacq. det. H. d. Werff
common in edges of woods.
- 2 04 2 Phoradendron henryi
parasitic on Croton sp.
- 2 05 2 Croton scouleri var. grandisilius Muell.-Arg.
common around meadow,
abundant on hill above.
- 2 06 2 Cuphea carthagenensis (Jacq.) Macbr. det. D. M. Porter
abundant locally See. 1969
- 2 07 2 Eriogonum
dominant in scrub around
meadow
- 3 08 3 Spermacoce
common, growing in scrub
around meadow
- 1 09 1 Vigna luteola (Jacq.) Benth.
common
- 2 10 2 Senna sophia (L.) Roxb. det. Barneby 84
Cassia abundant locally
- 1 11 1 Cyperus rivularis ssp. lagunetto (Steud.) T. Koy. det. Koyama 1974
common in wet places
- 1 12 1 Cyperus brevifolius
common in wet places
- 2 13 2 Eleocharis nodulosa (Roth) Schult. det. D. M. Porter 1974
abundant in wet places

Indefatigable?

79

- tufted; bracts white.
- aromatic herb, flowers
purple.
- dish white.
- tangled herb,
flowers white
- tangled; flowers yellow-
green, fruit immature.
- tree 5 m. tall, aromatic
when broken.
- plant reddish, flowers
magenta.
- shrub 1 m. tall,
compactly branched; sterile.
- stems reddish, flowers
white.
- creeping and twining
in grass, flowers yellow,
keel not twisted.
- shrub to 0.5 m. tall;
flowers orange-yellow.
- heads green.
- tufted

80 1964 Galapagos Is.

- 44814 *Azolla microphylla* Kaulf. det. Porter 1974
 5 abundant on small ponds, floating
- 1 15 *Digitaria horizontalis* Willd. det. D.M. Porter 1974
 common
- 1 16 *Oxalis corniculata* L.
 common
- 4 17 *Drymaria cordata* (L.) Willd.
 very common
- 1 18 *Lobelia galapensis* HBK. (det. Andersen 1978)
 occasional
- 2 19 *Euphrantopus spicata*
 occasional
- 1 20 *Datura stramonium*
 rare
- 5 21 *Acalypha*
 common locally
- 5 22 *Alternanthera halimifolia* (Lam.) Standl. ^{det. D. M. Porter, 1975.}
 abundant generally
- 1 23 *Solanum nigrum* L.
 common
- 2 27a (^{spp.}) ~~Succowia~~ *Gomphrena reticulata* (Mill.) Thraupi
 common locally
 Jan. 24 - near large crater
 about 1 km n.w. of Pable Mt.
 (Los Negritos).
 in mossy forest
- 2 24 *Tournefortia rufo-sericea* Hook. f. (det. D. M. Porter)
 occasional
- 2 25 *Peperomia galapagensis* Hookf. (det. H. Andersen 1978)
 abundant, epiphytic
- 26 (^{spp.}) common loco
- 1 26 *Plantago* ^{Plumbago} *major* L. (det. H. Andersen 1978)
 occasional in open place
- 2 27 *Asplenium auritum* var. *auriculatum* (Hedw. f.) Morton + Lettinger det. Porter
 epiphytic

Indebatigable?

81

- plants bright red
 in mass.
- erect, from creeping rootstock,
 flowers yellow.
- pedicels flexuous, sticky,
 caducous.
- flowers pale lavender.
- flow pale purplish white.
- prostrate, reddish.
- plant diffuse, reddish.
- extensively branching
 herb, flowers white.
- flowers purple.
- shrub 3 m. tall;
 flowers white.
- erect, fleshy.

82 1964 Galapagos Is.

- 44828 *Phoradendron henslovii* (Hodg.) Rob.
1 parasitic on *Sceleris*
1 29 *Fleurya austriaca* Gaud.
common
3 30 *Croton scouleri* var. *grandifolius* Muell.-Arg. det. Porter 1974
occasional
5 31 *Croton scouleri* var. *grandifolius* Muell.-Arg. det. Porter 1974
occasional
1 32 *Psychotria vibipes* Hoch. f.
common
2 33 *Bidens*
occasional in opening
5 34 *Parmelia*
on rotting fallen branch
2 35 *Asplenium praemorsum* Sw. det. Porter
on edge of crater
2 36 *Polypodium dispersum* A.M. Evans det. Porter 1974
abundant terrestrial
in crevices ~~&~~ at edges
of crater.
2 37 *Asplenium auritum* var. *auriculatum* (Hoch. f.) Morton & Lehmiger det. Porter
epiphytic
5 38 *Polypodium tridens* Kunze det. Porter 1974
epiphytic

Jan. 27 - Bella Vista
in Horneman Garden

- 1 39 *Datura*
planted and very persistent
3 40 *Polypodium insularum* (Morton) de la Sota det. Porter 1974
(with S. Horneman)
epiphytic in acaule tree
1 41 *Narino?*
planted

Indefatigable I.

- silt
stinging herb
small tree
small tree
shrub 1 m. tall;
fruit red, fleshy
flowers yellow.

200m.

- tree 5-6 m. tall, flowers
pendent, salmon pink.
acaulescent, flowers white.
6 stamens

83

84

1964 Galapagos Is.

44842 (grass) *Eleusine indica* (L.) Gaertn.
in trampled path

1 43 *Sida rhombifolia* L.
abundant

1 44 *Verbena littoralis* HBK.
common weed

#

Jan. 27 Bella Vista

around cleared ground

2 45 *Sicyocaulis pentagonus* Wiggins det. v.d. Werff~~climbing~~ climbing in fence row1 46 *Seneca pistaciifolia* var. *picta* (G. Don) Irving
Cassia & Barneby det. Barneby 84
in fence row2 47 (solan)
occasional by paths*Carphalum conjugatum* Berg.1 48 ~~*Eleusine indica* (L.) Gaertn.~~
occasional by paths* 2 49 (lichen)
on fallen balsa trunks2 50 (lichen)
on fallen balsa trunks3 51 *Amaranthus quitensis* HBK det. D. M. Porter, 1975
rare in roadside canals3 52 *Stictocardia tiliifolia* (Desv.) Hall. F. det. v.d. Werff
common in thickets2 53 *Bidens*
occasional in roadside5 54 *Trema micrantha* (L.) Bl. (det. H. Andersen 1978)~~common~~ common locally along road.2 55 *Bambusa vulgaris* Schrad. ex Wendl. det. Tom Soderstrom¹⁹⁷⁵
rare, planted

200 m.

Indebatigble 1.

85

spreading prostrate culms
tall herb, about 1 m., flowers
dull orange with maroon
center.
flowers purple.

elongate herbaceous vine,
flowers white.
shrub ~ m. tall.
buds yellow.
flowers deep purple
with pair of small
yellow spots on palate.

herb 1.5 m. tall, stems red.

erect herb 1 m. tall,
flowers yellow.
tree 8-10 m. tall.

large clumps, culms
dark green.

86 1964 Galapagos Is.

Jan. 27 "New Road" ~~to~~

near Bella Vista
along cleared roadway

- 44856 *Eclipta alba*
common in weedy vegetation
- 1 57 *Desmodium canum* (Gmel.) Schinz +
occasional Theilung
- 2 58 *Palvia occidentalis* Sw. (det. Andersen 1978)
occasional
- 2 59 *Desmodium Jimense* Hook.
common
- 2 60 *Desmodium canum* (Gmel.) Schinz
occasional + Theilung
- 1 61 *Coryza canadensis*
rare
- 3 62 *Priac. lappulacea* f. *albiflorum* ~~& Webb~~ 15 m. flowers white.
local
- 2 63 *Momordica charantia* L.
abundant
- 4 64 *Justicia galapagana* Lind.
common
- 2 65 *Rhynchosia minima* (L.) DC.
common
- 1 66 *Chiococca alba* (L.) Hitchc.
occasional in thicket
- 1 67 *Syntocardinia tiliifolia* (Beck.) Hall. f. det. v.o. no. 17
common

200 m.

Indepatigable).

87

erect; rays white.

erect, leaves glaucous
beneath.

flowers bluish white.

stems elongate,
sparsely branched,
flowers cream white.
erect.

flowers white.

extensive vine;
flowers yellow.

flowers magenta-pink.

herbaceous vine,
flowers yellow.

scandent shrub,
fruit white, fleshy.

extensive vine,
corolla rose-purple.

Jan. 27 "New Road,"

somewhat below Bella Vista
in roadside thickets

shrub 1.5 m. tall

- 68 *Acalypha*
occasional

150-175 m.

88 1964 Galapagos Is.

- 44869 *Capsicum frutescens* L.
occasional
- 4 70 *Clerodendrum molle* HBK.
var. *glabrescens* det. ^{var. glabrescens}
occasional
- 2 71 *Galactia velutina* Benth.
occasional
- 4 72 *Croton scouleri* var. *grandifolius* Muell.-Arg.
det. Porter 1974
- 2 73 *Malvastrum coronandelianum*
common
- 4 74 *Sida hederifolia* Cav. (det. O.M. Porter)
locally abundant
- 1 75 *Chrozocera alba* (L.) Hitchc.
occasional
- 1 76 *Elettaria indica* Gaertn.
occasional in road
- 1 77 *Croton scouleri* var. *grandifolius* Muell.-Arg.
common det. Porter 1974
- 1 78 *Senna sophia* (L.) Roxb. det. Barneby
Cassia 84
common
- 1 79 *Heliotropium indicum* L.
occasional
- 2 80 *Clerodendrum molle* HBK.
occasional var. *glabrescens* det. moll.
- 3 81 *Sida spinosa* L. (det H. Andersen 1978)
locally common

Jan. 27 - "New Road", Academy
Bay to Bellavista, at the
last major escarpment toward
Bellavista

On broken basalt

- 3 82 (fern) *Trachypteris pinnata* (Hook. f.) C. Chr. det. Porter 1974
common in crevices

Indefatigable I.

89

- shrub 1 m. tall,
flowers greenish white;
fruit scarlet.
- large shrub; flowers
white, tube pinkish.
vine; flowers pink.
- very common in
edges of forest.
flowers orange
- prostrate; flowers orange.
- shrub 1.5 m. tall,
flowers yellow.
- shrub 2 m. tall.
- low shrub; flowers yellow.
- flowers white.
- *H. angiospermum* Murr. (det. P.M. Porter)
- shrub 2 m. tall,
flowers white.
- erect.

10 am

curls up in dry weather, expands
in wet.

90

1964 Galapagos Is.

44883 *Polyphodium tridens* Kunze det. Porter 1974

3 common in rock crevices.

2 84 *Anredera ramosa* (Miq.) Eliassen det. H. V. M. W. H. common in rock crevices1 85 *Peperomia*
common ~~is~~ on rocks1 86 *Usnea*
hanging from branches
of *Psidium*.1 87 *Psidium galapagium* var. *howellii* Porter det. D. M. Porter
Dec. 1969 common5 88 *Phyllanthus carolinensis* Walt. subsp.
common in crevices and
along road.

Indefatigable ?

91

- twining vine, flowers
yellow, turning reddish.
- very fleshy, stems and
spikes reddish.

spreading tree 5 m. tall.

branches more or less
in one plane.Jan. 27 - "New Road"
above Academy Bay.
dry cleared roadway
on rocks and heavy ~~soil~~ soil

30-50 m.

3 89 *Portulaca oleracea* L.
common.3 90 *Portulaca oleracea* L.
common2 91 *Vigna Rhynchosia minima* (L.) J.C.
rare1 92 *Physalis*
rare5 93 *Heliotropium mandersonii* Robins. (det. P. M. Porter)
common on bare hard red soil

prostrate, fleshy, no
flowers open in late afternoon,
with 44880 but not
intergrading with it.
- ascending, leaves long,
no flowers open in late
afternoon; with 44889
but not intergrading with it.
- prostrate, twining,
flowers yellow.
- flowers yellow;
fruiting calyx prominently
angled, strongly depressed at base.
- erect; flowers yellow.

92 1964 Galapagos Is.

- 44894 *Alternanthera halimifolia* (Lam.) Stand.
on hard bare red soil
- 2 95 *Euphorbia viminea*
common on hard bare
red soil
- 10 96 *Frostichia juncea* Robins & Green subsp. *alata* Howell
one bush seen on hard
bare red soil

Indefatigable).

Det.
D. M.
Poster,
1975.

stems ascending.

the flat-topped shrub,
branching in one plane,
stems brown, leaves
fleshy, brownish green.

- much-branched
shrub about 1 m. tall,
fruiting stems arching
and pendent at tips.

(seed sample)

93

Outline
of route

Jan. 27 - "New Road" from Bella Vista to Academy Bay

This is a broad swath bulldozed through the forest from Bella Vista in almost a straight line from the corner of the clearing to the head of the Bay. There are one or two turns in it.

The road crosses about a scarp - one, at least, is a major fault. The others may be fault-like crevices of lava flows.

The upper part is very disturbed close to the village, with most of forest cleared.

Beyond this is a rather disturbed, or at least open, evergreen forest - Psidium, Salacia, etc.

This requires a mixed character and is rather uniform for some distance.

Below the village some distance the edges are lined with saplings of what must be a species of Salacia, though its habit + resembles the enormous Polyscias in Colombia. stems not as thick. It seems all sterile.

Indefatigable? 95

At first the forest was a dense herbaceous undergrowth. After some distance this thins out somewhat. Psidium still persists below its uppermost escarpment.

A dense growth of weeds occupies the road swath, but much of this is trampled so the weeds are not very rank.

Lida rhombifolia, of a particularly large-leaved and robust form, is most abundant.

The herb layer becomes very thin about half-way down but the canopy, for the most part, remains closed most of the way to Academy Bay.

Its composition gradually changes and *Bursera* becomes more prominent, while things like Psidium drop out. *Pisonia* is perhaps the most dominant tree for the entire middle part of the road. The sharp zonation of the other trees is not very obvious here. The forest stays more or less closed almost to Academy Bay.

—
but i
see phyto
neither

Jan 28 - helicopter flight across Indefatigable I.
Academy Bay - ~~Bella Vista~~
- Table Mt. - Seymour I. 1:50 p.m.
Completed notes of lava & rock
from air.

Aspect of higher parts
of island green, as much
from thick undergrowth
as from trees. Psidium and
Zanthoxylum trees are
brown, Beccaria bright light
green.

As soon as low plain on
north side is reached
the aspect becomes light
gray. The forest varies
from closed to open. Near
the coast are patches
with almost no vegetation
lava with red soil in
depressions.

Baltra I. is almost
entirely modified by an
base activity. General
aspect is desert - red soil
& black or gray lava with
scattered trees & bushes.

A younger lava is more
vegetated and oxidized than
an older surrounding glassy taboche.

From deck of U.S.S. Pine Island.
Baltra I. is essentially
flat, with 3 or 4 terrace
levels, topmost is completely
disturbed by old air-base.

Vegetation generally very
sparse, red ground showing
through. Some green back
of blaches - mostly Maytenus,
scattered trees with white
trunks and branches - prob.
Bursera. This is densest
on the low area between two
higher terraces.

North Seymour is also
essentially flat, sloping
gradually from west up to
cliff on east. Vegetation of
Bursera, seems much denser
than on most of Baltra.

Daphne Minor is surrounded
by cliffs, even undercut on
one side. Flat top has thin
forest. Dawson says this is
only on rim of crater and
is only Bursera.

Daphne Major is a
fine truncated cone,
scarcely clipped at
all. Williams says
both seem very young.
He also says that on James

1964 Galapagos

Jan. 29. Left ship by
helicopter 7:00 a.m. hrs. 7:10

Island is mostly
wooded with a Crotalaria
scrub up to 4 ft. tall

Small meadow-like
areas around periphery
of scrub have an
open dwarf scrub or
broad-leaf herb meadow
of *Alternanthera* spp.
which strongly resembles
Chenopodium vulvaria,
about 3 dm. tall; rounded
compact bushes. A few
herbs between these
clumps - *Cyperus*, grass,
etc., not common.

Common in *Alternanthera*
similar openings in
interior (photos 68 & 69)

Also three places in scrub
with many dead Crotalaria
and some still alive
but much less numerous
than the surrounding
ones (photos 68 & 69)

On slopes - dip-slopes of
tuft beds - open Crotalaria
scrub with thin grass
and amaranth beds, no *Alternanthera*
(photos 6 & 7)

Note

and

Scribner (Dawson) ? 99

Mockingbird young
finches " "
Red footed booby " "
Masked booby " "
(pink bill)
Frigate birds " "
Sooty terns " "
"large gall-like bird"
with gray back, black
head, white under parts
and a bright red ring
around eye, beak somewhat
hooked. " in thin places
in interior.

Ground-dwelling quail-like
pigeon brown with white marks
on outside of wings white wing
patch when flying, bright blue ^{greenish} _{red} feet, black bill curved down at tip ^{yellow} _{underparts greenish on sides}

The sooty terns nest
in even under the
desert scrub, although
more numerous in openings
even in cactus clumps.

There are one or more nests
of red-footed boobies in
almost every Crotalaria bush.
Finch nests in *Alternanthera*.
Masked booby nests on
ground in openings and
in scrub.

A few young frigate birds.
Pigeon walks around on
ledges of canyon.

On the upper slope of the hill an open scrub with the grass in general. In a shallow ravine a few clumps of Opuntia with soft yellow spines & little Alternanthera. More grass, but grass cover thin and discontinuous.

Hilltop is covered by thin crooked scrub with a moderate amount of Opuntia 1-1.5 m. tall.

Many flowers on foreground - a colony of Portulaca cutera, with a little grass and Alternanthera.

A deep canyon cut in harder tuff layers upon smooth, light gray sparse cactus scrub on walls, a little grass and Alternanthera. Photos from hill.

Down in the canyon the Alternanthera is much more luxuriant than seen elsewhere, up to more than 1 m. high, in masses.

Beautiful views of mouth of canyon, lower

like rocks (photos below) on top red spots, thought to be plants with masses of red flowers - turned out to be small frigate birds with nests expanded.

Opuntia around tops of cliffs. A little Portulaca on top ledge. But Alternanthera is most of cliff vegetation. A moss on peaty soil on ledge.

In canyon bottom several pools filled with nothing but vegetable debris.

Frigate tails will be making a noise like whining, squeaking & whistling. Hundreds or thousands of red footed boobies. Several frigate birds. Many finches - a few pigeons.

Many frigate birds soaring.

Canyon is cut deep into tuff beds that ends in a cliff. Beautiful rocks below in water (photos below).

Very hot in canyon, boobies panting. Many grown young boobie not yet able to fly. Brown

just to right (looking upstream) of the head of the canyon, is a large (a yard) clump of the slope, on half of which covers by a bedraggled open scrub 0.5-1 m tall of *Solanum*, *Pithecellobium*, with much *Alternanthera* between them (spotted), the other half a low semi-open growth of *Alternanthera*.

Widening marked by some photo nesting box with downy young. In scrub many brown young of red footed boobies, photo.

At about 3:45 p.m. a shower went by, and just a bit of the edge of it ~~was~~ hit the island. Great clouds of sooty terns were in the air while it rained, making a tremendous clamor.

The dwarf scrub of *Alternanthera* varies from open to closed. The individual clumps are 2-4 dm tall and 2-3 dm. across, touching to separated by up to 1 m. Each bush has an

intricately branched woody basal part much smaller than the bush from which herbaceous shoots are produced in abundance. The association is principally the one above but the grass, the *Cyperus*, the *Amaranthus*??

Jam. 30 - around camp saw short eared owl sitting between the bushes. Very tame, was watching a dove which circled about 3 feet from the owl, seeming not to be disturbed but keeping just that distance.

Mocking birds - brown with conspicuous gray collar. Two of them played together, one pursuing the other until mild preened and sitting on top of tent poles and singing occasionally. One found a large centipede and branched it to death, pecking at its head, jumping back when the centipede struck, eating a leg when it detached one, finally dragged the centipede off.

104

1964 Galapagos Is.

Jan. 29 - north side above
 bluffs cliffs (camp)
 in Alternanthera meadow

44897 *Alternanthera helleri*
 dominant.

2 98 *Cuscuta gymnocarpa* Engelm.
 parasitic on Alternanthera

5 99 (grass) *Eragrostis cilianensis* (All.) Lutati det. Reeder
 locally common ^{*Eragrostis major* Host.} (det. H. Andersen 1978)

, 44900 (amar.)
 occasional

(01) Crotom
 (02) Croton

same - in Crotom at scrub

5 { 01 Crotom

; { 02 Crotom scouleri var. darwinii Webstr. ^{det. D. M. Porter} 1974
 dominant

5 03 (grass) *Eragrostis cilianensis* (All.) Lutati det. Reeder
 in very small openings
 and thin places in scrub

^{DET.}
 5 D.M. Porter 04 (amar.) *Amaranthus sclerantoides* (Anders.) Anders.
 common in small openings

5 05 (grass) *Eragrostis cilianensis* (All.) Lutati det. Reeder
 in opening

same - in Alternanthera scrub

5 06 (amar.) *sclerantoides* (Anders.) Anderss ^{DET.} _{Porter 1974}
 occasional

5 07 *Cyperus anderssonii* Böckeler det. Koffman
 occasional.

140m

Cuprepha? 2

105

♀ ♂

dwarf shrub or
 suffrutescent herb,
 2-3 dm. tall, grayish
 especially toward tips.
 yellow-orange, thread-like,
 sterile.
 small tufts.

delicate herb

Q
 ♂

shrub 2-3 m. tall
 aromatic when broken.

150m

wispy tufts.

small wispy tufts.

6 140m

stems red.

1974

106

44964 Galapagos Is.

Jan. 29 - near highest
summit on island44908 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant in tall scrub5 09 *Portulaca oleracea*
abundant on open
slope2 10 *Tribulus cistoides* L.
rare on open slope
dominated by *Alternanthera*
dwarf scrub.5 11 *Portulaca*
common in openings
on slopes5 12 *Portulaca howellii* (Legr.) Eliass. (det.
H. Andersen 1978)
common in openings5 13 (grass) *Eragrostis major* Host. (det. H. Andersen 1978)
Eragrostis cilianensis (All.) Lutati det. Reeder
locally common on
open slope14 same - ~~canyon~~ canyon
at west end of island6 14 *Cyperus anderssonii* Böckeler det. Koyama 1974
rare on upper ledges15 (moss)
rare on cliffs at mouth, on peaty soil.

165 m

Culpepper I.

107

sterile young plant
to show large leaves.
fleshy herbs, stems
ascending, gray at
base, red above,
flowers yellow, about
1.5 cm across, open 10:3°
or, petals emarginate,
stamens about 20, style
branches 4-6, mostly 5.
prostrate, flowers
yellow, about 1.5 cm across.

160 m

ascending,
fleshy, stems brownish-gray
at base, brownish green
above, flowers yellow.
fleshy, stems prostrate
at base, thick, ascending,
base gray, distal parts
brownish green, buds
yellow.
tufts

150 m

tufts.

140 m

bright green.

108 1964 Galapagos Is.

~~Jan 29 - North side
culpepper's~~

44

44916 *Alternanthera helleri*
common on ledges

Erythrina velutina Willd.

Jan 29 north side

135 m

2 44917 *Erythrina velutina* Willd.
with Dawson
rare, only 2 trees seen

Jan 30 - northwest side (cont)
in *Alternanthera* dwarf
scrub.

140 m

5 18 *Cenchrus platyacanthus* Anderss. det. Porter
common on slight
rocky escarpment.

4 ^{det. Porter 1975} *Amaranthus sclerantoides* (Anderss.) Anderss.
common in spaces
between *Alternanthera*

1 20 grass *Eragrostis ciliaris* (All.) Lutati det. Reeder
common in spaces between
Alternanthera

1 21 *Alternanthera helleri*
abundant

Culpepper's I.

109

dwarf shrub 4 m. tall.
herbaceous branches
from woody base.
sterile tree.

seedlings only. old
fruits abundant on
ground. Old coarse
stems dried and decayed
- seen here and there.
stems reddish.

seedlings.

Jan 30 - camp - ctg
Finches & other birds
in cactus flower.

said to be several species,
but hard to distinguish.
Zosterops difficilis is one,
live in Alternanthera.

Immature red & footed
boobies seemly be sitting
on nests with eggs.

Along the coast to the
west of camp the croton
scrub is rather open
varying from closed to
at least as open as
70% coverage occasional
area completely open.

There is a fairly complete
ground layer of Alternanthera,
varying from closed to open
(photos). In some openings
in the scrub this layer
is sparse or absent. Terns
are abundant generally,
but those in openings are
mostly just nesting while
those in at least partial
shade have eggs or chicks.
Chicks vary from newly
hatched to having wings
feathered out. The red footed
boobies are abundant
in the trees, with eggs &

young. Occasional
frigate bird nesting on
ground or on sticks,
mostly immature.
On the outer edge, above
the cliffs there is a gap
where the vegetation is
sparse or lacking for
a few meters. for
considerable distances.
Few masked boobies are
nesting in abundance
with eggs, newly hatched
young, downy young.

The scrub varies in
height but is mostly
2-4 m. and the trunks seldom
reach more than 6 cm.
Many dead bushes still
standing, but easily
tipped over.

Exposure of very coarse
porphyritic basalt on
n.n. corner. Core drilling
it for palaeomagnetism measurements.

Vegetation on cliffs
mostly Alternanthera,
some Croton. ~~This~~ Some
male frigate birds on
cliffs with distended
pouches.

Many tern eggs with holes
pecked in them.

Headland covered by Alternanthera, with scattered Portulaca and patches of Amaranthus. Hundreds of marsh boobies nesting. One forked-tailed Tuti, nesting, had to be pushed off to see eggs. Pale blue-green, ~~yellowish~~ with gray and very dark brown. (photos) Under an Opuntia bush, (collected) (photos)

South of this is an area of bare ground with scattered Crotalaria, a few Portulaca and Alternanthera, and patches of marsh boobies. (photos)

This gradually changes to thicker scrub and the boobies are replaced by terns, great numbers of them, with eggs & chicks there & small completely bare places, where terns are just sitting.

Took soil sample 3 in this - almost black fine soil, 2-4 inches thick on rock.

Nearby in fairly dense

Crotalaria scrub 2-3 m. tall sample #4, also just a superficial layer 2-4 inches deep, of black soil, with many roots.

Back by the cliff took soil sample #6-7-8 in ~~the~~ Alternanthera scrub, top layer, is nearly black, inc. of layer, 3" deep, & is reddish brown this is on crumbly material, rather rotten, 4" is also reddish to yellowish brown.

Sample #9 is from within dense Crotalaria scrub back of camp. Here only a layer 2-4" deep on rock, black, on top gradually becoming brownish downward.

Sample #5 is lava from N.W. point

Sample #7 is rotten tuft from top of cliff on w. side of deep canyon at its mouth.

114

1964 Galapagos Is.

Jan. 30 - ^{south?}
west headland
of island.det.
porteri

on open top of bluff,

~~Alleranthus~~ scrub.44922 *Amaranthus scleranthoides* (Anderss.) Andress

locally dominant

2 23 *Portulaca*
common2 24 *Opuntia* cf. *helleri*
isolated clump

Jan. 30 - east of camp

in opening in *Croton* scrub1 25 (grass) *Eragrostis ciliaris* (All.) Lutati det. D.M. Porter
common1 26 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter
abundant

140 m

↓

Culpepper I.

115

stems from clear green to
clear red in same colony.~~stems~~ plant fleshy,

stems reddish, gray

at base, ascending,

flower's 1.5 cm. across,

petals emarginate,

stamens about 20.

clump about 1 m. high,
spines stiffer on basal
joints, yellow, soft ~~soft~~
on upper joints, flowers
yellow, fruit caducous.

seedlings

Jan. 30 - coast west
of coast
area of coastal
scrub with a
few short grasses
and a few short
succulent *Alternanthera*.

One *Euphorbia* tree
about 40 cm tall.
I heard in a area
of very open Crotalaria
with *Portulaca*
covering much of
the ground between
the plants starting to close at
a 30 cm. I took grass
mosquito traps next
in *Erythrina* & beautiful
open blue eggs reported
with dark markings on
large end. One bird
sitting. Other brown with
a crest. He attacked
me feeding on leaf
matter & disturbed the
nesting one. Both
made quite a fuss.

Immature male
pebbled grass whole
above, red eye ring
eye bright entirely black.

Gendron
Fox?
Amaranthus:
Alternanthera
Portulaca
Cyperus
Erythrina
Tabularia cistoides
Crotalaria
Cuscuta

Probably a ~~dynamic~~
relationship between
concentrations of birds
over a period of time and
destruction of Crotalaria scrub.
Birds tend to occupy the
openings, slowing down
revegetation. *Portulaca* & grass
seems to do best in open
in spite of bird. Little
tendency evident for
Crotalaria to invade
Alternanthera dry
scrub. But others
Crotalaria is thin, *Alternan-*
thera form an undisturbed

Jan 30 Left Cenepape
at 5:15 pm. for Wenman

On arched rock near
Cenepape, in open vegetation
on flat top.

Wenman I. - a small
flat topped island off
shore, and flat part
of main island covered
by a thin open Coton - up
the bush 2.5-5 m. tall,
mostly branched.
Leaves 1f - 8 ~~ft~~ long.

Stems seldom exceeding
3 cm. dia.

This is an extremely
rough bouldery ground,
but under surface layer
of boulders is a layer
of black soil.

In much of the
soil there are prominent
ground layers of Alternanthes
but in places this is
lacking. Opuntia as in
places abundant, up to 1m.
or tall, in places scattered,
in places lacking.

Spacing of the cactus
is generally from 0.5 to
1.5 m. but cactus are
spare and narrow and
irregular, but coverage

is very incomplete.

Large openings or very
sparse places in the scrub
are dominated by Opuntia
but have *Hamelia*, *Pitcairnia*
Conchava, possibly
Brenesia scandens (too
dried up to be at all sure),
Alternanthera, and
in lower wetter one,
Cyperus & sp. & *Molinia*.

Center of area, in a
rather sparse place,
a male flight bird, with
red powder sitting on
egg early afternoon.

In central part of
area about $\frac{2}{3}$ of it cacti
are dead, mostly fallen.

Here there are no boulders,
only sharp pebbles & cobble
size debris lying on soil
surface.

Scattered clumps of
Alternanthes and patches
of Cyperus.

Here the red footed booby
& Ingati Pinata are nesting
in fallen tree rather
than shrubs, one form
are fallen while still alive.
These and fresher dead one.

120 1964 Galapagos I.

Jan. 31 - ~~north~~ corner

in thin Croton scrub

on rough boulder substratum

44927 *Sporomea linearifolia* Hook f. (det. H. Andersen 1978)

4 occasional in openings

5 28 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

5 29 *Alternanthera helleri*
very common generally

1 30 ~~#~~ rare in open area at top of cliff

1 31 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

5 32 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
dominant

2 33 *Mollugo gracillima* Anders.
in earth-filled interstices
between lava boulders in
opening

5 34 *Cyperus aristatus* Rottboell det. Koyama 1974
abundant in earth-filled
interstices between lava
boulders, in openings

5 35 *Cyperus anderssonii* Böckeler det. Koyama 1974
^{common} in opening

5 36 *Portulaca*
abundant in openings
also seen at tops of cliffs

Wenman (Wolf) I.

100 m



extensive vine; flowers
pale lavender with
deep purple center.

- slender shrub 3 m. tall

bush 0.7 m. tall, woody
- up to about 0.4 - 0.5 m.
sterile

slender shrub 3 m. tall

shrub 3 m. tall, sap
reddish, somewhat watery.
sterile

erect tuft

fleshy plants
stem ascending, gray
at base, reddish, flowers
2 cm. across, yellow, petals
emarginate, stamens 7-2-2,
style branches 3-5, mostly 4.
fls open mid-morning to at
least midafternoon.

121

all pointing more or less
east. Old lava over,
so other directions.

On east side of flat
peninsula a growth of
Erythrina. During day
of cliff I saw 10s of
these shrubs. Varying from
tree to tree in height.
A red footed booby was
sitting on egg in one of
these trees. A pair of Geospiza
difficilis were hightailing
on its tail and pecking at
under the upper tail feather.
Dad, pushing around the
wing tips. Even little
while the bird would
flick its tail. The fresh
would jump aside. But
snipe at least, when return.
This kept up for 15 minutes
or so. Thought it was
meets them were after
and some they pecked
about on the feathers, it
may well have been.
However, close examina-
tion showed that the area
at base of main tail
feathers was bleeding
and the birds were
mostly pecking at the blood.

Birds seen

Red footed booby
Makado booby
Frigate bird
Machado bird
Doves
Geospiza difficilis
Geospiza sp
Fork-tailed gull

In the *Erythrina* grow
which is a couple of
hundred yards long
and no more wide,
the ground is covered by
a certain mix. larger of
pebble to cobble size fragment
which is a 1/2 cent
layer of black fine soil.
Then rubble vegetation

Locally there are
enormous, a regular
boulders, but few few.
Other examples are
seedlings and young
plants of a number
of species not or scarcely
seen elsewhere, some in
numbers, others rare,

red-billed
land bird
note below
about

Around cliffs on a
side of the white-tailed
open land - very red.
Several forked-tailed gulls.
Hundreds of masked boobies
nesting on edge of cliff
at least half way up
mountain.
Geospiza diffusa of hilltop
around the base rock.

On this ridge and
one especially at the
foot of the talus below
at the very edge of the
cliff, scattered matless,
only a few bushes - aquatic
sprawling stems with
clumps of compact branches
at ends - the whole not
much over 1 m tall.
Associated with shrubs i
Erythrina, some Portulaca and
abundant Alternanthera.

On other side a colony
of *Calicotropis procera*
in from cliffs in, rather
dense Croton scrub.
Cliff type more or less
bare, nesting places for
countless masked boobies
Alternanthera, Croton, Portulaca

Manow Wenman is
a knifed-edge, with
some thick plant.
mainly is flat
topped and covered by
Cistanche scrub.

Photos of Croton to
show fastigiate habit.

Steep talus on east
side at base of cliffs
of high end - open
Croton scrub, with
some Opuntia, and an
open shrub layer of
Alternanthera, a few
scattered *Headsia* bushes.

From high on main plateau
peak - happens some
diagonally across from
Erythrina group that
seems to have large
Croton (P. notes blue bud)

Jan. 31 - West side
in Croton scrub just
back from cliff,
Heliotropium parviflorum L. →
small colony

120m

44937

Jan. 31 - east side

~~edge~~ at top of cliffs

10 38 Scalesia incisa Hook. f. ^{Scalesia bauvii}
^{ssp. hopkinsii (Robins,}
a few bushes at foot of talus
on cliff edge. ^{Eliass.)}
^{(det. H. Andersen}
¹⁹⁷⁸⁾

6 39 Alternanthera helleri
dominant on talus

5 40 Scalesia incisa Hook. f.
on ridge ^{Scalesia bauvii subsp. hopkinsii}
^(Robins, Eliass.)
(det. H. Andersen 1978)

H. angiospermum Murr. (det. D.M. Porter)small shrubs up to 0.6 m tall.
flowers white, eye greenish.

140m

densely branched
bush 0.4 m. tall.

150m

graveled bush 1 m. tall,
densely branched at
tips. flowers white.

Jan. 31 - east side

100m

in Erythrina grove

5 41 Acalypha
locally common

1 42 Heliotropium parviflorum - →
rare

11 43 Cardiospermum corindum L. det. D. M. Porter
1970
very local

5 44 Erythrina velutina Willd.
dominant

2 45 Licher
on branches of Erythrina

H. angiospermum Murr. (det. D.M. Porter)

sterile climbing in undergrowth.

thorny tree 5 m. tall,
widely spreading.
prods and ~~no~~ beans from
ground.

128

1964 Galapagos Is.

- 44946 *Fleurya aestuans* Gaud.
2 common
1 47 *Galactia*?
rare
1 48 *Aphyllis* cf. *angulata*
rare
2 49 *Amaranthus*
occasional
1, 50 *Ipomoea*
rare
1 51 *Ipomoea*
occasional
1 52 *Ipomoea*
rare, 1 plant seen
3 53 *Letania*
rare

Jan. 31 - center of north
plateau

- 2 54 *Cyperus*
common in sparse
open area in Crotom scrub
3 55 *Cenchrus*
common in sparse to
open area in Crotom Scrub
3 56 *Ipomoea*
abundant in sparse to
open area in crotom scrub
climbing over Opuntia

Wenman I.

129

- all plants young
all plants young
seedlings only, seen.
all plants young
seedlings only,
seedlings only,
seedlings only,
erect tufts

wet tufts

- seedlings, only, seen.
vine, flowers white with
yellow center

West summit -
covered by a thin scrub
of Cistus with a sparse
ground flora of Alternan-
thera, some Portulaca,
a few other herbs, a
few gnarly bushes
of Cordia intermedia, some
Opuntia a few very
few small bushes of
Scelzia.

The small cirque like
hanging valley on
the west peak appears
a bit more mesophytic -
but still green
Crotalaria scrub.

Difficult to reach
because of a sharp
knifed-edge there is
a 2 m vertical - rock
ridge with no
apparent hand or foot
holds.

The deep almost vertical
canyon between the two
on the west side has
some seepage spots
with perhaps a grass
or sedges mat collected
and on the talus in its
bottom a plant not
recognized - perhaps a desert
Alternanthera. The heath



in the seepage spots
has larger leaves

15.1 At sea no land found of island
of Los Chiles, a small
island, name
Frégate Island, was
marked by many, probably
twice as many Geopigeo
as Frégate. No nodules seen,
but reported from there
yesterday by others.

Only vegetation, a few alien
thera bushes & Opuntia on a cliff.

Crabs seen only on the
side of island. Also
mainly grass.

Yesterday saw sparrow -
neat looking, colored
wings, black above,
white beneath, flying
in and out of cliffs
s of long peninsula.

Samples

133

- 1 Phosphatized (?) tuff from surface of ground, Culpepper?
 - 2 rotten tuff from near mouth of large canyon.
 - 3 black soil from base spot in Croton scrub, center of I.
 - 4 black soil from ~~base spot~~
~~in~~ Croton scrub, center of I. near #3.
 - 5 ~~black soil from~~ ~~Croton scrub,~~
~~near #4.~~ Coarse basalt.
 - 6 soil sample - black soil from ^{top} Croton scrub, near #7-9.
 - 7 soil sample, Culpepper, in alternanthes scrub, surface
 - 8 same middle layer, red-brown.
 - 9 same partly weathered parent material
- W. man?
- 10 black soil from under pebble layer in Cyathus grass
 - 11 crust on lava in overhang near top of peak.
 - 12 purple surface on lava near top of peak
 - 13 ~~5~~ ¹³ ~~Leiomorphus~~
 - 14 beachrock
 - 14 beachrock and sand, Narborough I.
 - 15 blue material from ground.
 - 16 Pumice from 1000' alt. pumice field.

Feb. 2 - Reconnaissance
helicopter flight - Roca
Redonda, Narborough,
north part of Albermarle.
started 6:30 am.

Roca Redonda is a tiny
flat topped rock several times
as long as wide and at least
as high as wide, perhaps
higher. Top is whitish and
not rough, perhaps phosphat-
ized. Sides rough, some
layers roughly columnar
jointed. Only trace of vegeta-
tion is what seems to be green
algal staining in places
on the sides, esp. the west side
and north end. Many
hundreds of forked tailed
gulls seen, several frigate
birds and red footed boobies.
Albermarle.

~~Narborough I.~~ - west
peak is a high plateau
with forest on top separated
from other part by a barren
lava intervening with
cones like craters of May
Is. On SW side there is
green veg. above the basal
flows. On cones on west
is open & sparse Bursa.
esp. in craters.

On sides of main cone
above basal flows, also,
sparse Bursa, etc.
In lava flows nothing
but small ponds in
lava near s. shore.

At base of steep scarp
on alluvial fan some
bright green vegetation.
The top and sides of
this mountain would
 repay exploration.

Narborough I. - north end.
Vast lava flows at first
and on lower slopes. Some
show several small trees
patches of trees, patches of
grass, bits of mangrove
fringe. White sand beaches.
many ponds and
complicated shore line
with mangroves and
some sand strand veg.
Clumps of short Cereus
in crevices of lava flow.
This is Punta Espinosa.
landed at 7:25.

Milizophora and laguncularia
around salt water ponds.
Took off at 7:35
Cluster of little cones
on lava flows.
Near base of mountain.

main
island

bryophytes of what appears to be *Bursera*, very spant. some slightly older flows and bryophytes with a few short *Jasminoceras*?)

Toward other sides clusters of new cones and bryophytes of rather dense *Bursera* forest. as we go around the bryophytes become greener and greener but many are on newer lava and still not very vegetated.

Then even on new lava scattered cacti. but nearer coast nothing on ~~lava~~ new black lava.

On older gray lava scattered bushes and cacti, green bryophytes.

Red lava beds with scattered bryophytes and on older tract, scattered cacti.

Small clumps of cones scattered around - "burn landscape"

The farther around we go the greener the bryophytes.

On s.w. side the slopes are green above the lava flows. Many bryophytes are small cones.

whole flower, from base of mts. to sea are green, open forest, probably *Bursera* with some brush. This on s.w. side.

The flows become greener away from sea.

On side of mountain the vegetation seems to be a green scrub, with trees in lower place and ravines. Worth an extreme effort to get up to the zone.

Mountain top seem flatish, covered by a low forest.

Many young cones and narrow flows.

Patches of grass with trees, mostly an almost closed forest with a grassy growth - more *escarpiaoides* shrubs? between trees.

Higher up forest, the upper part is mixed, much of it broken.

All of this on west side of crater.

Some water in bottom of crater but not a real lake.

north ^{west} slope steep, orange-red lava flows. Many vegetated bryophytes lower down, some rathe-

high - the lower no leafless, the higher more green. Some veg. on lava.

Top of north end also wooded plateau upper bipulpa green lower leafless but dense forest. No veg. on lava.

Lava pool in bottom of crater also a large cinder cone with a green lake in its crater. Nothing on lava pool. Some water in places in surface of lava pool, esp. toward west side.

On ^{north} east side the uppermost bipulpa is lush and green closed forest, become more open and less green downward to almost barren over lava plateau at base. The lower bipulpas are brown against black new flows.

No mangroves along coast here at all, except at and near Punta Espinosa which is an extremely complicated bit of coastline.

Crossed channel to Albemarle. Lava against us.

Very complicated break enclosing a lagoon on west coast at about center. Beaches here are

gray. Some very small bits of green vegetation - mangrove.

Lava flows on this side are rather - or completely - barren. Some scattered cacti on older ones and bipulpas. - Large cerecias scattered on upper surfaces.

Crossed second saddle. Here are many but widely scattered cerei and a few other trees.

This slope of second mountain to left of us, bright green upper bipulpas and slopes to right in winter less have considerable vegetation - largely deciduous, just coming into leaf. This especially in bipulpas, which are very numerous.

Slopes of second mountain are less green toward east coast, but a wide plain here is vegetated except at extreme coastal strip. Bipulpas along coast are sparse & openly vegetated. Flores have scattered cerei and small trees but are generally barren.

Bulge in coast has nothing on flows, very thin vegetation in traps. Extreme coastal traps have nothing. One bit of mangrove around a tiny bay ~~and~~ & at. and several mangrove trees in ponds back of stone just to left of course.

Feb. 2 - Duncan? seen from ship

Gentle slopes, thinly vegetated, low sea cliffs n. w. ends, higher n. s. w.

Nothing that looks from a distance like forest yet no very unweathered lava. General gray, brown to very slightly greenish appearance. Perhaps thin grass & low scrub. [is sand] A large crater still visible.

Feb. 3 - left Paltia for Marborough at 11:50 by helicopter flew over Daphne Major. scattered low Opuntia in crater, some on outer slopes. also ~~had~~ bare bushes. Otherwise thin grass, etc. Bottom of crater is a flat with no vegetation, apparently a pale gray or buff ash, but probably caked by water. (photos).

A number of small island or rocks east of ~~Daphne Major~~ (or James?) - photo with helicopter. These islets are rather barren-looking from a distance.

A small slightly elongate rock and others, in a group of 3, have almost no vegetation - very thin dry grass (or lichens?).

Tower I. (?) - barren-looking but apparently has a deciduous scrub vegetation and Opuntia. Prominent yellow patches seem to be either a yellow tuft or another, prostrate, Opuntia.

Feb. 1 - summit peaks
and plateau

230 m

- 44957 *Scalesia*
occasional
- 5 58 *Cardiospermum corindum* L. det. D. M. Porter 1970
on plateau
- 1 59 *Hermosa*
common on plateau
- 2 60 *Cordia lutea* Lam.
rare, a few scraggly
bushes on rocky summit
- 2 61 *Heliotropium parviflorum* L.
occasional on rocky summit
- 1 62 (grass) *Eragrostis cilianensis* (All.) Lutati det. D.M. Porter 1974
rare in crevices on rocky summit
- 1 63 *Cyperus anderssonii* Böckeler det. Koyama 1974
common on rocky summit
(abundant in places on plateau)
- 5 64 *Portulaca*
common
- 5 65 *Cuscuta gymnocarpa* Engelm.
very rare, parasitic on
Alternanthera (and slightly
on *Mollugo*)
- 2 66 *Ramalina*
very common on rocks
- same - on rock ledges and
crevices just below summit
- 5 67 *Euphorbia nummularia* (Hochst.) Burch det. v.d. Werff
occasional at base of cliffs

shrub, flowers white.

wine, flowers white.

seedling only, collected

shrub, corolla yellow.

flowers white
H. angiospermum Murr. (Pet. D.M. Porter)

fleshy, lower stems
gray, upper red; flowers
yellow & con-across, petals
emarginate, stamens 25-27
style branches 4.
pale orange threads;
flowers white.

210 m

brittle, glaucous, branches
more or less in one plane.

144

1964 Galapagos Is.

- 44962 *Amaranthus sclerantoides* (Anderss.) Anderss. det. D.M. Porter, 1975
common on ledges and talus
- 1 79 *Alternanthera helleri*
abundant on ledges and talus
- 1 80 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
common
- 5 71 *Heliotropium angiospermum* Murr. (Pet. J. M. Porter)
rare in crevices
- 6 72 *Mollugo gracillima* Anders.
common on ledges and in crevices
- 5 73 *Fleurya aestuans* Gaert.
very common on ledges and talus.
- 3 74 (grass) *Eragrostis ciliaris* (All.) Lutati det. Reeder
occasional on ledges, ~~and talus~~
- 75 *Croton scouleri* var. *darwinii* Webstr. det. D.M. Porter 1974
abundant on steep ridge and talus

Feb. 1 - on north point

in terrace

- 25 76 ~~abundant~~ abundant in openings & in Croton scrub

Feb. 2 - Punta Espinoza
Marborough?

around lava pools

- 26 77 *Rhizophora mangle* L.
local, growing in salt water on lava
- 27 78 *Laguncularia racemosa* (L.) Gaertn.
local, growing in edge of saltwater on lava

Wenman I.

145

stems red

to small shrub,
grayish green

shrub 1.5 m. tall
(extreme leaf size)

dwarf, shrub, flowers white.

petals 4-5 patent, white;
plant diffuse

stinging

shrub 2 m. tall

decumbent with
ascending branches,
spine on upper joints,
very weak, yellow;
fruits green, proliferous.

shrub 3 m. tall

shrub 2 m. tall

Central Albemarle -

west flow slopes reaching far up the side of the volcano before the break in slope up to the main cone.

Bits of mangrove locally along coast. Vast areas of old flow with open to closed *Bursera* forest, beginning to turn pale green up-slope. Sparse on less weathered lava, and only scattered trees in the darker flows. No really new lava here.

Upper part of this forest quite green, very mixed and closed but rather thin. Much long Usnea on trees. Canopy surface very irregular, many shades of light green.

Then a very rough lava field - aa. with scattered trees, sunken boulders well part, some places almost nothing.

Other slope, beyond this aa, similar to upper part of east side, but gets more and more bare downward.

But here change is spotted, some large green trees and many small bare ones. no pure *Bursera* even down near shore.

Narborough I. - Considerable

mangrove around lava ponds and on beaches to

- short distance along shore where we crossed. Then bay lava of several ages with no vegetation for a long distance. Then a rift with scattered elongate breached cones - new. Then older lava with scattered *Cedrus* and small green boulders. 2 new rifts. More new lava but with green boulders of several ages.

- Alternating flows of different ages: some green, most brown with scattered vegetation, some with almost none. More rifts. Many boulders. Then a strip of green, very wide.

148

1944 Galapagos Is.

Feb. 3 - s.w. slope of Narborough I. 1000'

Sparingly to well vegetated.
on lava, with *Bursera*
and *Zanthoxylum*, near
scattered, more densely
in lower spots.

Sparse shrub layer of
Psychotria, *Cordia*, *Solanum*, *Lippia*,
etc., many ferns
Pilea, *Elaphoglossum*, *Hypolepis*,
Acalypha, *Lettuce*, etc.
on ground.

Trees more abundant
near base of small con.,
here *Psychotria* in *Solanum*
are common under trees,
not very common in
open lava. Several
vines in tree, *vitis*

Narborough I.

149

Carpenter bee seen visiting
Psychotria and *Rhynchosia*.

Pumice field - (photographed)
grassland dominated by
Bouteloua but with *Paspalum*
abundant also.

Plant list

a	<i>Bouteloua</i>
a	<i>Paspalum</i>
ea	<i>Rhynchosia</i>
a	<i>Alternanthera</i>
~	<i>Pectis?</i>
o	+ <i>Ipomoea</i>
la	woody comp.
o	<i>Cordia</i>
c	<i>Salvia occidentalis</i> Sw.
	<i>Crotalaria</i>
c	<i>Cyperus</i>
o	<i>Cyperus</i>
c	<i>Cyperus</i>
la	+ <i>Cuscuta</i>
nc	<i>Gilia</i>
nc	other fern
o	<i>Opuntia</i> cf. <i>saxicola</i>
o	combs.
c	<i>Cenchrus</i>
ea	<i>Cissampelos</i>
o	<i>Zanthoxylum fagara</i> (?)

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Borneria
 Aristida
 Acalypha
 Lippia
 Phyllanthus.
 Chilococca alba (L.) Bl.
 + Crotalaria
 Psidium galapagense Hook.f.
 + Bidens
 setaria
 Waltheria
 Cassia
 Psychotria
 + Lotus?

The vegetation is generally closed rather bushy, grass dominant but with a considerable herb component.

Locally abundant a sparsely branched arching cord-like (comp.) shrub, elsewhere Waltheria.

Abundant vines are Cissampelos Rhynchosia, locally blanket out other plants.

Alternanthera forms mats, locally crowding out the grass.

Salvia small patches

Small outcrops of lava occur scattered through the punica field. In these the 2 ferns are common; Glechoma rare. Cyperus of various only seen in grassland or punica outcrop of one of these outcrops.

Principal grasses,
in order
 fructicosa
 Paspalum
 setaria
 aristida

Around the margins scattered Bursaria graveolens.

Photos b+w) from cone to n.w. also plots out toward sea, and one of scrub of cord-like composite shrub. With it brown Polypodium, Boreria, Cordia, Cereus, Rhynchosia, Froelichia, Lippia, Mollugo, Acalypha, Passiflora, Zanthoxylum, Bursaria in inside of cone.

152

1964 galapagos I.

Feb. 3-5 - southwest slope
in broad green strip
running from summit to sea.
on well vegetated aa lava
with pumice in the cavities

- 44979 *Phoradendron*
parasitic on *Croton*
5 80 *Croton scouleri* Hook. f. var. *scouleri* det. Porter 1974
rare
5 81 *Acalypha*
common
5 82 ~~Tromneffia~~ *pubescens* Hook. f. (det H. Ander ^{SEN 1978})
rare
5 83 *Cyperus*
local on pumice pocket
5 84 *Cyperus anderssonii* Böckeler det. Koyama 1974
local on pumice pocket
15 85 *Cyperus aristatus* Rottboell det. Koyama 1974
local on pumice pocket
5 86 *Fleurya aestuans* Gaud.
common
3 87 *Doryopteris concolor* (Langsd. & Fisch.) Kunth det. Porter 1974
occasional
1 88 *Phyllanthus carolinensis* Walt. subsp. *carolinensis*
~~occasional~~
1 89 rare
1 90 *Heliotropium parviflorum* L.
rare
5 91 *Acalypha*
common
5 92 *Croton*
rare

1000'
300 m.

Marborough I.

153

large bush, reddish green.

tree 4 m. tall

dwarf shrub.

shrub 2 m. tall,

flowers white.

culms spreading.

culms erect, spikes reddish.

stinging herb

Porter 1974

det. D.M. Porter
1974

branches more or less

in one plane.

flowers white, on rounded

pedicels, petals ~~apetalous~~

apetalous, ovary inferior.

flowers white.

tangled dwarf shrub.

small tree, 4 m. tall, with
erect branches.

154

1964 (Galapagos),

- 44993 *Udianthus*
common in crevices of rocks
- ✓ 94 *Passiflora*
occasional climbing in small trees.
- ✓ 95 *Senna pistaciifolia* var. *picta* (G. Don)
Cassia of Irving & Barneby det. Barneby 84
occasional
- 2 96 *Polypodium tridens* Kunze det. Porter 1974
epiphytic, common
- 1 97 *Lida hederifolia* Cav.
rare
- 3 98 *Asplenium nidus* Sw. Det. Porter
local in crevices and
cavities in rock
- 2 99 *Udianthus coronarium* H.B.K.
occasional in cavities in rock
- ✓ 15000 *Chionocarpus alba* (L.) Blah.
rare
- 5 01 *Polypodium tridens* Kunze det. Porter 1974
common in cavities in rock
- 5 02 *Passiflora suberosa* L.
occasional, climbing in trees
[from with linear lobes]
- ✓ 03 *Commelinia diffusa* Burm. f.
common in shade
- 2 04 (comp.) *Brickellia diffusa* (M. Vahl) Gray
rare in shade
- 5 05 *Pilea bonariensis* Robins.
common in shade
- 6 06 *Froeckelia nodicaulis* sp. unigens
occasional

Nanborough).

155

vine

shrub 2 m. tall
flowers deep chrome yellow.

prostrate, flowers orange.

shrub 3 m. tall; fruit
white when ripe.vine, flower with calyx
pale green, no corolla
corona filaments whitish,
yellow distally, disk and
gynophore purple, ovary green,
fruits immature.det. Porter
prostrate, flowers
pale purplish, closed
in afternoon.flowers dull buff,
erect, stems reddish.low much-branched
bush. (seed sample)

156

1964 Galapagos Is.

- 45007 *Spermacoce elliptica* (Hochst.) Tafel
occasional
- 5 03 *Paspalum galopogaeum* Chase var. n. ^{galopogaeum}
abundant
- 5 09 *Psychotria rupestris* Hochst.
abundant, mostly under trees.
- 6 10 *Solanum erianthum* D. Don
very common
- 5 11 *Cordia leucophylla* Hook f. (det. H. Anderson 1978)
occasional
- 8 12 *Solanum (lycopersicum) cheesmanii*
common
- 5 13 *Asplenium*
abundant in cavities in rocks
- 5 14 *Lippia rosmarinifolia* Anders.
common det. Mattox
- same - on open aa
lava flow with scattered
vegetation
- 7 15 *Solanum Acanthum ellipticum* Hochst.?
rare
- 5 16 *Cheilanthes sulphurea*
common in cavities in rocks
- 6 *Notholaena galapagensis* Weatherby & Svens det. Porter 1974

Marbrough?

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- erect dwarf shrub;
flowers minute, 4 parted, white.
clumps, culms more or
less erect.
- diffusely branched,
rather tangled shrub,
to 1 m. tall; flowers
white, fruit red, fleshy.
~~trees~~ ~~seen~~ spreading
shrub, 1-1.5 m. tall;
leaves green beneath; flowers
pale purplish.
- shrub, many stems
from base, 2 m. tall;
flowers white.
- diffuse herb, flowers
yellow, ripe fruit greenish
yellow, soft, slightly
acid with rather poor flavor
(seed sample)
- flowers pinkish to yellowish-pink
shrub 1-2 m. tall (others
seen tree-like, to 4 m.)

small tree 4 m. tall, brittle.
fruits immature

158 1964 Galapagos Is.

- 45017 (ankef.) *Sarcostemma angustissima* (Anderss.)
 common
 (det. H. Andersen 1978)

3 18 *Paspalum galopageium* Chase var. *galopageium*
 rare

5 19 *Spermatoce*
 common

7 20 *Scaevola affinis*, cf. ⁽¹⁷⁾ Hook. f.
 common

same - on small spathes
 cone with much ~~so~~ fine
 pumice deposited on
 surface, partly grass
 partly loose shrubby
 vegetation.

5 21 *Aristida repens* Trin. det. D.M. Porter 1974
 common on open scoria rim

8 22 *Pomoea* cf. *alba*
 common, climbing on trees
 in crater

1 23 *Bombus oleraceus* L.
 rare on open scoria rim

2 24 *Spermatoce*
 rare on open scoria rim

1 25 (hepatic)
 on shaded overhanging earth bank

7 26 *Chiococca alba* (L.) Hitchc.
 occasional

Narborough I.

159

almost leafless sprawling
 prostrate tangled lactiferous
 shrub; petals & dark
 brown with green margins,
 corona parts pale green,
 stigma brownish.
 tufted.

dwarf shrub, erect.

low spreading bushy,
 flowers fragrant, white

extensive vines
 flowers white, closed
 in afternoon, pedicels
 inflated.

~~rare~~

glossy green
 small tree 4 m. tall,
 flowers yellow.

- 45027 *Zanthoxylum fagara* L. Song.
common det. D. M. Porter Dec. 1969
- 7 28 *Waltheria ovata* Cav.
common on outer slopes
- 7 29 *Froeelichia nudicaulis* Hook. f. ssp. *lanigera*
common on bare scoria rim (Anderss.) Eliass.
(det H. Andersen 1974)
- 7 30 *Cordia revoluta* Hook. f.
common generally
- 5 31 (Conf.) *Blainvillea dichotoma* (Murr.) Stewart
common on scoria rim
- 2 32 *Cyperus aristatus* Rottboell det. Koyama 1974
very local on spot of
gravel on scoria rim
- 4 33 ~~Lobelia darwinii~~ ~~darwinii~~ ~~temmeli~~ (H.B.K.) ^{Hartung}
~~lobelia~~ *xalapensis* (H.B.K.)
common on scoria rim
- 5 34 ~~Isagoras~~ *Darwinisthianus* *temmeli*
common on scoria rim
- 1 35 *Cyperus*
rare on scoria rim
- 5 36 *Cenchrus platyacanthus* Anderss. det. D. M. Porter
occasional on slopes 1974
- 5 37 *Gossypium darwini* Willd
common on outer slopes
near base
- 1 38 *Galactia velutina* Benth.
rare, climbing in bushes
- 1 39 *Lippia*
common on scoria rim
- 1 40 *Salvia*
rare on scoria rim

det. Pater

- small spreading
tree, aromatic when broken,
fruits green
- shrubs 2 m tall,
branched from base
flaring at tops, flat-
topped, branchlets in one
plane, flowers yellow.
- depressed much-branched
shrub.
- erect shrub, mostly
branched at base, 2 m.
all flowers white
- flowers white
- shrubs 1.5 m. tall,
disk yellow, rays white.
- ulms spreading
depressed.
- shrubs 1.5 - 2 m. tall,
bolls only in dead branches.
- twining, flowers pink,
kee. not twisted.
- erect shrub, flowers
pink.
- flowers purplish.

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1964 Galapagos Is.

- 45041 Pectis? *Chrysanthellum pusillum* Hook f.
locally common in scoria rim
7 42 (comp.) *Macrorhiza laevigata* Hook.f.
abundant in scoria rim

same - in open grassy
pumice field.

- 5 43 *Cuscuta gymnocarpa* Engelm. (det. H. Andersen 1978)
common, parasitic
on grasses and various herbs
- 5 44 *Cyperus anderssonii* Böckeler det. Koyama 1974
common
- 3 45 *Cyperus ligularis* L. det. Koyama 1974
occasional
- 2 46 *Chiococca alba* (L.) Blahs
occasional
- 1 47 *Cyperus aristatus*
~~inaccessus~~ Cyperus aristatus
on top of small exposure
of lava with fine pumice
sand on it. det. P.M. Porter
- 5 48 *Cenchrus platyacanthus* Anderss. 1974
occasional
- 5 49 *Sporodes bilobal.*
common
- 6 50 *Salvia occidentalis* (det. H. Andersen 1978)
common
- 6 51 *Crotalaria incana* L.
common

(to p. 170)

Mariongah I.

163

flowers yellow, plant
without strong odor
sparsely branched
erect to arching shrubs,
2 m. tall; flowers yellow.

threads dull orange,
flowers white
small tufts, culms
erect, spikes green
tufts, leaves glaucous;
culms erect, spikes
reddish green.
shrub 3 m. tall, flowers
yellow, fruits flattened,
immature.

Rottboell det. Koyama 1974

erect, spikelets purple.
creeping, flowers rose pink.
just beginning to close
in middle of day.
prostrate with ascending
branches, forming a mat;
flowers pale bluish.
flowers yellow, flushed
with reddish (but not striate)
outside; pods inflated.

1964. Galapagos Is.

Feb. 5

series of photos on way
lava and of land iguanas.
2 or 3 hot; across from me.

Apparently more than a
normal fall
has gone & complicated
merges into semi-ag with
thin vegetation

Several small grassy
spots on up the slope but
none as large as where we
camped.

Green strip continuous almost
to sea.

East of it at least 7 or 8
acres of flows that have
little vegetation

Where *Monteloua* tufts
are sparse, mat of *Alternanthera*
or *Rhynchosia* fills interstices.
Bare spots where iguanas
sun themselves, and at
mouths of barrows.

D. Carvajal has found young plants
at edge of rough lava flow
10 m. n. of camp - with many
old ones.

Marborough I. Albemarle²

Feb. 6 - left Marborough I
10:45 by helicopter
to Duncan?

South coast of n. w.
peninsula of Albemarle.
gentle slope, dry, open but
of *Bursera* alternating
with ~~a~~ a deciduous open
scrub. Here and there darker
green trees mixed with
light green *Bursera*. Toward
sea the scrub is more
predominant.

Then crossed an area of
green closed to open mixed
forest, some *Bursera*.

Then a patch of very
rough ag, with some
scattered vegetation.

Then a strip of green closed
low forest, then another
area of very rough ag
with depressions - biquibas
with bright green closed
forest.

Then more closed mixed
forest for some distance.
Does not extend to sea, but
gradually fades into deciduous
scrub.

Along course more and more
dominated by *Bursera* and
become thinner until it is
an almost leafless open *Bursera* forest

for a long distance - a few scattered dark green trees in it. Becomes thinner. Ground is somewhat irregular. One area is pale green mossy gray and leafless. Approaching coast first gradually fades out to almost tan, cut brown and weathered lava.

A deep inlet on coast with mangrove fringe and a rather extensive patch of mangrove at its head, which runs into a strip of pale green bushy forest extending inland. slight mangrove fringe, broken, along coast. In distance considerable mangrove in patches along coast, these extend discontinuously for some distance, backed by a vast lava plain.

Darwin I. - covered by a low deciduous scrub covered by lichens. - scrub arborescent *Bursera* - scrub of *Croton* & *Propolis*. Some scrub veget on crater walls. A lot of Crates red with short spars bushes. Patched in, big

Oreocentis near top. The scrub is fairly thick. The yellow rocks seen from ship are lichen-covered.

Marborough I. (ctd.)

Cone to west of Pumice flat - slopes have much fresh pumice, and covered by a scrub of the scarcely branched linear-leaved composite, this form open to tangled. The stems are up to 2 m. long. *Cordia* and *Sippia* scattered in with it. Some *Bursera* in the little craters. *Mollugo* in open steep spots. A few large *Cereus* on slopes and top.

Wellthrus, especially, tending to invade the pumice, also *Cordia*. The woolly composite is common generally, but abundant locally. Both on pumice and on cones and on lava.

Hedera mostly on open lava a few on slopes of west cone.

Feb. 6 - Helicopter-Baltra to Academy Bay.
Baltra I. - Large areas of exposed red soil with sparse vegetation. Also areas peripheral, of lava cinder with sparse vegetation.

Indefatigable. - Wherever the shore is low there are mangrove fringes.

Inland from shore vast areas of lava cinder with pockets of red soil - sparse vegetation, mostly Bursera. This gets denser inland. The patches of red soil get scarcer and gradually vanish.

Inland there are patches of red soil, small - flat seem wet. Then now. Pure semi-open Bursera forest for miles. Still practically leafless. Until mountains are approached when it gradually becomes greener.

Then a gradual admixture of olive trees and a pair of collapse craters - as the road runs. Wet forest from here to Table Mt. Ponds still have Azolla. See wild cow.

Brown tail mixed with que (heathie). Large area of forest, some of it not

much disturbed, but mostly uprooted and with heavy herbaceous undergrowth.

This gradually fades into more open scrubuous forest, mostly Bursera.

Scrub area only local around Academy Bay.

Feb. 7 - Academy Bay, photos of scrub and cactus skyline on south side of Bay, also of mangroves on rock, north side, nose station. (red. only.)

Also of Academy Bay settlement. Left, on patrol boat 7 p.m.

Coastal *Cryptocarpus* scrub extends a mile or so along the shore from the station. Then the shore is a low cliff.

On top of this is an *Opuntia*-*Bursera* forest with a dry leafless undergrowth.

The *Opuntia* soon gets lower, the *Bursera* soon drops out, the scrub, perhaps *Croton* becomes the dominant vegetation with considerable low *Opuntia*. Perhaps a mile beyond the end of the *Cryptocarpus*, or maybe a bit more, the *Opuntia* becomes

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1964 Galapagos 2.

- 45052 *Bouteloua disticha* (HBK) Benth.
det. D.M. Porter 1974
5 dominant plant
- 5 53 *Alternanthera filifolia* (Hook.f.) Howell det. D.M. Porter 1975
dominant locally
- 5 54 *Festuca setosa* (Sw.) Beauv. det. D.M. Porter 1974
very common
- 5 55 *Cuscuta gymnocarpa* Engelm. (det. +)
Andersen 1978
very common, parasitic on
Rhynchosia and several other
species
- 1 56 *Bidens riparia* HBK. ?
rare
- 1 57 *Psidium galapagense* Hook.f.
occasional, scattered
- 5 58 *Rhynchosia minima* (L.) DC.
abundant locally
- 5 59 *Cheilanthes microphylla* (Sw.) Sw. det. Porter
very common generally
- 5 60 (conj.) *Blasiella dichotoma* (Mars.) Stewart
occasional
- 5 61 *Latus*? *Tephrosia decumbens* Benth.
h?
very local
- 5 62 *Cissampelos pareira* L.
locally abundant
- 2 63 *Cissampelos pareira* L. ?
locally abundant
- 1 64 *Passiflora suberosa* L. ?
occasional
- same - on rough aa lava
with little vegetation.
- 3 65 *Cheilanthes sulphurea*
common in cavities

Marbrough?

171

- in small tufts
culms ascending, spikelets secund.
forming a dense mat,
stems purple
1 or more small erect
tufts.
- orange threads; flowers
white.
- var. *galapagense*
det. D.M. Porter
Dec. 1969
young plants only, seen, sterile
vine forming mats;
flowers yellow.
rhizomes buried, fronds
erect.
- 1974
det. Porter
prostrate; flowers pink.
~~extensive~~ twining vine,
flowers whitish.
~~extensive~~ twining vine,
fruit immature.
climbing or bush; flowers
greenish, corona segment
yellow, # gynophore purple,
very green.

= *Notholaena galapagensis* Weatherby & Svens
det. Porter 1974

172 1964 Galapagos Is.

17064 *Physalis pubescens* L.
rare

17 same - in rough as lava
~~soot~~ with irregular
woody vegetation

1 67 *Lippia normanifolia*
common

3 68 *Croton scouleri* Hook. f. var. *scouleri* det. Porter 1974
occasional

4 69 *Tournefortia pubescens* Hook. f. (Det. P. M. Porter)
occasional

4 70 *Cordia*
occasional

5 71 *Tournefortia pubescens* Hook. f. (det. H. Andersen en 1978)
occasional

3 72 *Cordia leucophycis* Hook. f. (det. H. Andersen 1978)
occasional

5 73 (solan.) *Amirtus ellipticus*
rare

5 74 (fern) *Trachypteris pinnata* (Hook. f.) C. Chr. det. Porter 1974
abundant generally on
rocks.

5 75 *Pterodendron hispissimum*
abundant, parasite on
Zanthoxylum fagara

1 76 *Polyporus*
on dead wood

5 77 *Cyperus brachystachys* Anders.
common *Cyperus anderssonii* Böckeler
det. Kayama 1974

1 78 *Polypodium pectinatum* L.
locally common on rocks

1 79 *Commelinia diffusa* Burm. f.
occasional

Marborough).

173

flower yellow with few
brown rectangles at base
of corolla lobes.

small shrub.

shrub 3 m. tall.

shrub 2 m. tall; flowers
white

- tree 4 m. tall; flowers
white.

- small tree; flowers
white.

- shrub 2.5 m. tall
flowers white.

- small tree about 4 m. tall,
flowers white, fruit green.

green spike ~~at~~ dark reddish,
fruit white.

yellowish white above,
white below, partially
resupinate.

small tufts, spikelet
green.

- *Polypodium dispersum* A. M. Evans det. Porter 1974

det. Porter prostrate, flowers white.

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1964 Galapagos I.

- 45080 *Bursera graveolens* (HBK) Trian.
common
det. D. M. Porter
Dec. 1969
- 2 81 *Lida spinosa* L. (det. H. Anderson 1978)
rare
- 3 82 *Phyllanthus carolinensis* Walt.
subsp. *carolinensis*
common
det. D. M. Porter 1974

- same - in open pumice field
2 83 *Opuntia* cf. *saxicola*
occasional

Feb. 5 - same loc. on sides
of small cone covered
by pumice, with some
lava rock exposed.

- 5 84 *Dodonaea viscosa* L. var. *spatulata* (J.E.S.M.) Benth
det. D. M. Porter 1970

- 4 85 *Phoradendron*
~~occasional~~, parasitic on *Zanthoxylum fagara*

- 1 86 *Galactea velutina* Benth.
rare

- 1 87 *Vigna Suteola* (Jacq.) Sont.
rare

- 2 88 (moss)
on tree trunks

- 1 89 *Phoradendron*
parasitic on *Lippia*

- 1 90 *Gymnacme*
very common in scrub

- 5 91 *Mollugo satrapa* Robins (det. H. Anderson 1978)
occasional in open places

- 2 92 *Cordia revoluta* (Forst. f.)
common

Marborough I.

175

sterile tree 5 m tall,
bark white, smooth.
flower orange calyx
with reddish sulci.
branches more or less
in one plane.

tree with definite trunk,
ripe fruit spherical,
greenish.

shrub 3 m. tall.

plant dark reddish green.

flowers pink

flowers yellow, seed
not twisted.

~~—~~ plant dark
reddish green.

dwarf shrub, prostrate
to erect; flowers 4 parted, white.

flowers white; rosette
leaves gone from most plants.

shrub, flowers white, tubular.

det. Porter

176 1964 Galapagos Is.

45093 Phoradendron

parasitic on *Cordia*

1 94 Phoradendron

parasitic on ⁺ 45096 (Diplochela?)

5 95 Baccharis ^g. *gridifolia* HBK det. Porter
rare

2 96 (comp.) *Maurandya tiliifolia* Hook.f.
abundant

3 97 Polypodium tridens Kunze det. Porter 1974

very common terrestrial

1 98 (arclef.) *Sarcostemma angustissima* R.W. Holm.
(det. Andersen 1978)
occasional

same - in prairie field

5 99 *Cordia revoluta* Hook.f.
common

det. Porter

Feb. 4 Duncan I.

45100 *Croton scouleri* Hook.f. var. *scouleri* det. D.M. Porter
1974

common in low thin scrub

Academy Bay

Feb. 6 Santa Cruz I.

501 *Portulaca lutea*

planted from material
collected on Plaza I., off
coast of Indefatigable
by Dr. Smith from

Marborough I. Duncan 177

Indefatigable

plant dark reddish green

plant dark reddish green

shrub 1 m. tall

sparingly branched
arching shrub 1-1.5 m.
tall, head yellow.
fronds erect

almost leafless, tactiferous,
twining, corolla segment
dark brown with green
margins. corona very pale
green.

erect fountain-like shrub
with many stems from
base, 2 m tall. flowers
white, tubular.

shrub, m. tall, sterile.

8' 10"

stems ~~at~~ ascending,
red above, grey-brown
below; flowers 5 cm. across,
petals emarginate.
stamens 38-45, stigmas
4-5. flowers and plant
said to have been much smaller in
wild state.

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1964 Galapagos Is.

Feb. 8 Academy Bay

2 m.

- 45102 *Crocosma erecta* L.
edge of mangrove
- 2 03 *Laguncularia racemosa* (L.) Gaertn. f. sp. D.M. Porter
Magnolia octogona (R. Br.) DC. det. D.M. Porter 1970
- 2 04 *Celastrus*
common in coastal scrub
- 5 05 *Croton scouleri* Hook.f. var.
common in coastal scrub
- 1 06 *Hippocratea mananilla* L.
common in coastal scrub
- 5 07 *Hibiscus tiliaceus* L.
very local in coastal scrub
- 5 08 *Sesuvium portulacastrum* L.
common along seashore
- 5 09 *Croton scouleri* Hook.f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 5 10 *Croton scouleri* Hook.f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 1 11 *Croton scouleri* Hook.f. var. *scouleri* det. D.M. Porter 1974
common in coastal scrub
- 5 12 *Cordia*
rare, near Nelson house
- 1 13 ~~rare~~ *Strobilanthes*
rare on bare rock
- 1 14 *Mesembryanthemum*
planted in Nelson yard

Indefatigable?

179

- shrub 1.5 m tall.
- small tree 4 m. tall.
- shrub 2 m. tall
- slender tree 4 m. tall.
- lactiferous, poisonous,
small tree.
- small tree, flowers
bright yellow, in
afternoon turning reddish.
- prostrate, stems
reddish, leaves dull.
- flowers pink.
- shrub 3 m. tall.
- shrub 3 m. tall.
- shrub
- shrub 1.5 m. tall, flowers
white, fruit red.
- shrub, flowers white.
- prostrate to ascending,
very fleshy, flowers
deep orange.

1904 Galapagos Is.

Birds seen on
Marborough at 1000'.

doves

morning bird

Barn owl

hawk

Vermilion flycatcher

phoebe-like flycatcher

with yellow belly.

finches of a number
of kinds incl warbler finch~~and others~~

Birds seen on Indefatigable?

Brown pelican

Lava gull

Fregatta minor

Curlew

Ruddy turnstone

Mangrove warbler

Vermilion flycatcher

Short-eared owl

various finches

morning bird

green heron

Great blue heron

very sparse and soon essentially disappears, leaving a plain. This is just about opposite Jensen Island. The latter is mainly covered by *Cryptosperus* scrub, with a clump of a deciduous scrub near center; several white beaches and low dune. A brackish pond with green algal, acc. On, who, with Peabman, brought some plant snaps.

On mainland, the scrub forms a zone extending a bit back from the cliffs. From the cliffs taper off and there is stretches of white beach extending between bits of rocky shore. Not far inland the *Bursera* forest with some *Opuntia* gradually takes over. It is a bit green. The narrow deciduous scrub zone extends almost to the point backed by *Bursera*. *Opuntia* with deciduous scrub understory. The point is rocky and very sparsely vegetated. The second small headland

is also rocky but more or less covered by a low yellow-green shrub - also seen on the rocky shores back by the beaches.

Back of this is deciduous scrub with scattered *Opuntia*, just beyond it, *Opuntia* forest.

Back of this and extending up to the foot of the steeper slope is a green forest of *Bursera* with scattered *Opuntia*.

This gradually pades into the vast *Bursera* plain on the north side.

Some mangroves locally along the shore, bits of white beach. Several small cones in this plain, covered also by *Bursera* forest, but here very sparse. The dark red substratum shows through. The larger cone does not show this sparseness.

Considerable *Opuntia* in this forest.

Patches of mangrove occupy a considerable proportion of this shore. No cliffs here but rock alternating with beach.

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1964 Galapagos Is. Seymour!

In cliffs on n.e. corner of
Seymour (Baltra) a few
plants of *Scalesia crockeri* (var.)
(coll. by D. Snow), previously
known only from a few
plants on south Seymour cliff.
These mostly in poor condition, acc.
Snow.

185

Feb. 8 - crossed Salinas point.
vegetation definitely
brown, mostly savanna,
e. of Santa Elena.
Conspicuous erosion.

Only distal part of
~~peninsula~~ visible - the rest foggy.

Inland the landscape
is quite green. - savanna
open forest and thicket, some
cultivated patches - trees
bright green.

Denser forest farther inland,
continuous over fairly large
area, rather hilly land.

Foggy rather seeon day, but
this may be because of
its seasonal character.

Then cultivated patches
are more frequent. Rio Guayas
visible far ahead. Country
quite hilly along course -
manabí oats? Forest is very
green and closed.

As Guayaquil is approached
more and more cultivated
patches and more evidence
of shifting agriculture. But
some substantial patches
of what appears to be rather
undisturbed forest.

Then large areas of
bright green marsh or

wet savanna with winding
tidal channels lined
by ~~savanna~~, then
wast area of swamp
with only a few areas
of dry land, great
intersecting channels,
a few bare spots with
no vegetation, Batis?
around edges.

Swamp stretches southward
from large shaggy
area of extensions of
Guayaquil. Then
the city itself.

Wooded hills just to
north and west of it.

Feb. 9 - trip Guayaquil to
Playas

In Guayaquil - street trees
Washingtonia cf. robusta
Cananga odorata
Pitcairnia sparsiflora
Cassia cf. noosa
Sideroxylon segra
Euphorbia campanulata
Ficus microcarpa
Roxstonea alberdensis
Terminalia catappa

Sedimentary hills
 in first several km.
 covered by secondary
 thickets, tangled with
 vines, some slopes with
 grass and scattered trees.

Landscape green Dec. & March
 & April, completely dry the
 rest of year. Rainfall varies
 enormously year to year

Beyond this hills covered
 by secondary savanna and
 open forest with spaces between
 trees occupied by broad-leaved
 herbs & vines, shrubs, etc.

Savanna character becomes
 rapidly more pronounced westward.
^{peiba} Great *Bombax* reluff. become
 common. At about km 40
Acacia comes in and soon

becomes abundant.

Near road much of
 land is cleared and
 cultivated. Much
 burning.

Xerophytic character
 increases, and at about km 15
 columnar *Cereus* appear.
 Prospes abundant.

Progress. Turn off toward
 Gulf of Guayaquil, to s.w.
 Vegetation here is an open
 scrub forest with many
Cerei - most or all species
 deciduous. *Cordia* lutes
 common. Microphyllous
 component very important.
 Spacing in places
 quite close. In places
 dominantly microphyllous,
 small trees or large
 shrubs with scattered
 large *bombacaceae*.

A large *Hymenocallis* &
Pancratium is common
 locally in more open
 places.

This vegetation is generally
 rather tangled with vines.

Becomes lower and locally
 very open to south, on rolling
 low hills. *Cereus* becomes
 very common locally.
 Km. 73.

heights only 2-4 m. for most common, the Cereus and bombacaceae, a few other trees, taller.

General vegetation more and more leafless - scattered trees coming into leaf. Larger ones esp. Bombacaceae still leafed out.

About 1 km from coast landscape is greener - open forest & savanna. Very little herbaceous growth. Statue varies locally number of cacti also.

Large open areas with only scattered shrubs. Sheet erosion very evident. Thin grass on perhaps 1/4 - 1/2 of the ground. Locally areas of scrub with scattered trees, or of open forest with shrub understory.

Playas. Diffuse town of small houses and shacks.

East along beach, for some distance summer cottages abundant.

Beyond these a long strip of sand with scrub lying between Delta Lagoon and sea.

Broad flat belt of completely bare salt encrusted soil back of marshes (^{photo})

entrance to Delta Lagoon
Mangroves line entrance
Low scrub with some
small *Prosopis*, etc.
Pine or coconuts.

Scrub is of *Cordia lutea*
Vallisneria, *Acacia* sp.
Lantana, etc. Toward
beach *Cordia* is ~~abundant~~
in pure stand. Inland
this, a zone of sparse
Hamelia peruviana. (photo - ^{bad})

This scrub is discontinuous
each spreading shrub
having piled up a small
dune of gritty sand
around itself. The tops
are largely dead, active
growth and flowering around
periphery. photo

Inland a few yards
a few patches of *Acacia*
and a bush of *Vallisneria*.
A small colony of *Lantana*.

On opposite side
of channel to lagoon is
a strip of mangrove -
almost pure *Rhizophora*,
except a few scattered
Avicennia.

Acacia scrub forms a very
flat, very spiny mat.

The lagoon has mangroves in the area toward the mouth, with a rather narrow saline bare zone between the mangrove and the higher ground. Westward the saline zone becomes rapidly broader, near western lobes no mangroves at all, but wide areas of salt flat with herbaceous vegetation around margins.

In thin but closed forest (72.5 km.) bet San Antonio and Progress *Carica papaya* - rare along road. (km 73) *Hymenocallis* sp. very common.

Progress to Salinas

semi-open to closed scrub forest, deciduous many trees now leafing out. leaves almost absent.

About km 78 the scrub forest thins to a savanna with some bare bushes in the open spaces.

Cerei become abundant at about km. 81.

Trees become farther and farther apart bare shrubs more abundant.

General aspect becomes more sparse and leafless (km. 95)

Mts. to left are green and wooded.

About km. 96 large areas are actual desert with bare ground, scattered bushes. Some distance from highway appears to be savanna with thin low grass.

About km. 100 the ground is higher and varies from savanna to scrub forest. Alluvial hills.

Beyond this a rather open savanna. This becomes gradually more sparse and desert-like. Few shrubs green.

Beyond crossroad 5 much of country is true desert. Sheet erosion is very evident.

Km. 115.

About km. 116 bushes become more abundant to form a leafless open scrub about 1-1.5 m. tall. Small area is much dug up for gypsum (?) bumps used in making cement.

Low area here green with *Cryptocarpus*.

Scrub thicks out some. (to N. 196)

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1964

Feb. 9 - mouth of Danta Lagoon,

e. of Playas

on sand flats, back of beach

45114^a *Cordia lutea* Lam.

dominant in open scrub

2 15 *Acacia*

common component of scrub

1 16 *Ipomoea pes-caprae* var. *bascienensis* (L.) v.
in open loose sand oststr.2 17 *Vallesia*

common in open scrub

2 17a *Lantana*

common in scrub

Feb. 9 - bet. San Antonio and

Progreso, Km 72-73 on road

to Playas from Guayaquil
edge of open scrub forest1 18 *Tymenocallis*

very common locally

3 19 *Carica parviflora* (A. DC.) Solms
rare

Feb. 9

on coast east of Santa Elena

1 20 *Lycium*
common in low scrub

1-2 m.

Ecuador

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spreading shrub; flowers
bright yellow; fruit white, fleshy.

shrub up to 2 m. tall,

flowers orange-yellow.

sterile, seeds from sand surface

shrub 1 m. tall, flowers white

shrub 2 m. tall, stems and
spines green, flowers yellow-green,
ripe fruit red, most fruits immature.

flowers white

unbranched, 1 m. tall

cyme and buds red inside
of corolla pink.

rigid shrub; flowers white

Km. 124-5 desert with sparse low shrubs.
Succowia locally common.
 More vegetation near Santa Elena.

East from Santa Elena,
 over low hills with sparse
 scrub. down to sea. Road
 along beach ridge. Back of
 beach ridge an enormous
 silt flat, bare or with mats
 of ~~Crotophantes~~ *Maytenus*.

Beyond this low bare hills
 of silt or siltstone. Sparse
 scrub. Some arborescent *Cerei*.
 These are along coast.

Vegetation a depressed open
 scrub of *Maytenus* and
Lycium some taller shrubs
 and *Cerei* back from shore
 on hills. Flats salt crusted.

Bare silt flats, on way
 back, examined very quickly.
 friable cracked silt. Locally
 a few small *Evolutionis* sp.
 Otherwise no vegetation.

On slightly higher (~ few cm)
 ground, *Maytenus* with very
 thick leaves, these held vertically
 and a few bushes of *Lycium*
 and *Lagunaria* (?) very
 depressed.

(Photos - kod.)

(photos)

one label
unless otherwise
noted

Galapagos
 Plants collected by Allyn Smith

Tower Island, Jan. 30, 1964

- | | |
|-----|---|
| (2) | 1 <i>Opuntia</i> |
| (2) | 2 <i>Opuntia</i> |
| | Jenson I., off coast of <i>Indefatigable</i> I. |
| | Feb. 1964 |
| 3 | <i>Lycium</i> |
| 4 | <i>Sesuvium portulacastrum</i> L. |
| 5 | <i>Portulaca lutea</i> L. |
| 6 | <i>Heliotropium curassavicum</i> L. |

Plants collected by David Cavagnero

Narborough I., green strip on SW slope

Feb. 4, 1964

- | | |
|---|--|
| 1 | <i>Asplenium</i>
inside tiny crater on walls of shady damp lava
2500 ft. |
| 2 | <i>Saxifraga oliverae</i> L.
on punice in <i>Polyodium</i> zone 2500 ft. |
| 3 | <i>Desmodium</i>
<i>Polyodium</i> fern zone, 2500 ft. Flowers pale blue |
| 4 | <i>Psilotum nudum</i> (L.) Beauvois
2500 ft |
| 5 | <i>Nephrolepis</i>
2500 ft |
| 6 | <i>Brachythecium occidentale</i> L.
2500 ft |
| 7 | <i>Adiantum</i>
2500 ft |
| 8 | <i>Asplenium</i>
2500 ft |
| 9 | <i>Asplenium</i>
2500 ft |
| | near <i>Polyodium</i> most common fern on old lava |

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- 10 *Pteridium aquilinum*
common only in depressions where moisture collects
2500 ft
- 11 *Thelypteris*
2500 ft
- 12 *Asplenium*
2500 ft
- 13 *Asplenium*
2500 ft
- (?) 14 *Pityrogramma calomelanos*
2500 ft
- (?) 15 *Polypodium*
3000 ft most common fern on old flows, chief
ground cover in most areas high up.
Cyperus recurvus?
- 16 3000 ft on pumice sand of old land - iguana run.
- 17 *Polypodium*
3000 ft epiphyte on *Zanthoxylum* sp.
- 18 *Eragrostis*
2500 - 4800 ft
- 19 (comp.)
2500 - 4800 ft
- 20 *Erigeron*
2500 - 4800 ft
- 21 *Spermacoce*
2500 - 4800 ft
- (?) 22 (comp.)
2500 - 4800 ft
- 23 *Mollugo*
2500 - 4800 ft
- 24 *Spermacoce*
4800 ft
- (?) 25 *Solanum*
4800 ft large clumps growing at edge of Scabina Zone, on

galapagos Is.

1964

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- 26 (lichen)
Plant collected by E. Yale Dawson
- Alingdon I. shore
- 24951 Euphorbia
shore, 25 Jan. 1964
- 24952 Candelia ?
26 Jan.
- (?) 24953 Prosopis
near shore. 26 Jan. prostrate
- 24954 Alternanthera echinocaula (Hook.f.) Christ.
near South shore. 26 Jan.
- 24955 Waltheria
South shore, 26 Jan.
- (?) 24956 Coldenia
S. shore 26 Jan.
- 24957 Ilomola
S. shore 26 Jan.
- Bindloe I.
- (?) 24958 Jan. 26
- (?) 24959 Waltheria
Jan. 26
- (?) 24960 Coldenia
Jan. 26
- (?) 24961 Crotalaria
Jan. 26
- (?) 24962 Euphorbia
Jan. 26
- 24963 Cordia lutea Lam.
Jan. 26
- 24964 Euphorbia
Jan. 26

200

24965

(?) # Spermacoce
Jan. 26

24966

Ipomoea

Jan. 27

James Island, James Bay, Jan. 27

24967

(Asclep.)

24968

Opuntia

(?) (1) 24969

~~Dioscorea~~ Scutia

(?) (1) 24970

Tournefortia

(1) 24971

Acacia

(?) 24972

Bursera

(?) 24973

"liophyta"

(?)

(?)

Braemborg, S. & Petersen, C.G.

Rundt, jorden rundt på torannahand.
1-250 Oslo, 1961.

Account of voyage, including
visit to Taiwan and Lake Hohing
in Manchuria.

Syozo Itow

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Tel. 502-0868

ABBOTT, Donald	LARUELLE, Jacques	VAN STRAELEN, Victor
AMADON, Dean	LINDSAY, George	VERCAMPEN & GRANDJEAN,
ASHLOCK, Peter	LINDSLEY, E. Gorton	WALKER, Boyd
BARNARD, J. Laurens	LOWENSTEIN, Jerold	WEBER, William
BARTHOLOMEW, George	MARISCAL, Richard	WHITNEY, Pete
BILLEB, Stephen	MACKAY, Stuart	WIGGINS, Ira
BOWMAN, Robert	MARTIN, Edgar	WILLIAMS, Howel
CARPENTER, Charles	MC BIRNEY, Alexander	ZULLO, Victor
CAVAGNERO, David	MILLER, Alden	
COHEN, Nathan	MILLER, Robert	
COX, Allan	MURPHY, Jack	
CUTLER, Betsey	NAHMMACHER	
DANIELS, Farrinton	ORR, Robert	
DAWSON, E. Yale	ORTIZ, Fernando	
DEBENEDICTIS, Paul	QUEVEDA, Alejandro	
DIETLEIN, Donald	QUINTERO, Pilar	
DURHAM, J. Wyatt	PALMER, Clarence	
FOSBERG, F. R.	PAPENFUSS, Ted	
FOURNIER O., Luis	PERLMAN, David	
GILMARTIN, Amy	PYLE, Robert	
GRANJA, Ing. Julio	RICK, Charles	
GONZALEZ, Ernesto	ROBLIN, Alfred	
HAMMER, Nancy	RODRIQUEZ, Gladys	
HENDRICKSON, John	SCHUSTER, Robert	
HOBSON, Edmund	SILVA, Paul	
INGLES, James	SMITH, Allyn	
ITOW, Syuzo	SNOW, David	
KERMEEN, Alice	STEBBINS, Robert	
KIESTER, Alan Ross	STEPHENS, Stanley	
KOFORD, Carl	TORY-PETERSON, Roger	
KUSCHEL, Guillermo	USINGER, Robert	

1/23 dinner

Dawson

24959 - *Waltheria*

24952 *Castela galapageia* Crata Cas.

24948 " "

24955 *Waltheria crata*

24969 *Lentia parviflora*

24972 *Bursera galapagensis* (Hoeh. & Weber.) Triana & Pl.

(HBK) Triana & Pl.

iveque

34 *Carry lambertii* Lindl.

182 " *Waltheria crata*

111 *Passiflora colenouanii* Wigg.

170 *P. foetida* " *galapagensis* Kelly

118 *Capraria peruviana* " Kelly

29 *Erythrodia weberiana* Bently

171 " *Habenaria monorrhiza* "

134 *Lentia pauciflora* Hochst.

153 " *Solanum americanum* Mill.

3 " *Solanum americanum* Mill.

49 *Satura inornata* Mill.

U.S.

Josberg coll.

Galapagos

Rubriocere
Ceylon
Josberg 1870
Labels in

USS PINE ISLAND (AV-12)

2 February 1964

Tentative Helo Flight Schedule for the period 2-10 February 1964 in support of the National Academy of Sciences Project, Galapagos.

All flights except 2 February will depart Isla Baltra at 0900s and return to Isla Baltra at about 1130s daily.

SUNDAY - 2 FEBRUARY

- a. 0600 - take off. Clockwise circles of Roca Redondo, N.W. tip Albemarle, and land at Punto Espinoza. Pick up 3 people (Usinger, Schulke, and Perlman). Return to ship via N. Albemarle.
Starting from ship: Cohen, Bowman, McBirney, Fosberg. Return 0730.
- b. 0830 - take off to Punto Espinoza, drop Billeb and pick up Kiester.
Recon. of S. Narborough and supply drop; then return Baltra. Starting from ship: Hendrickson, Billeb, Dawson, Williams.

MONDAY - 3 FEBRUARY

0900 - take off.
To S. Narborough and drop off Hendrickson, Kiester and Fox.
Starting from Baltra: Hendrickson, Kiester, Fosberg, McBirney (returns to Baltra.)

TUESDAY - 4 FEBRUARY

0900 - take off.
To Jervis and drop off Dawson, then to Punto Espinoza and drop off Cox; return to Baltra.
To S. Narborough and drop off Ashlock and Cavagnaro; pick up Dawson from Hervis and return to Baltra.
Starting from Baltra: Dawson (returns), Cox, Ashlock, Cavagnaro.

WEDNESDAY - 5 FEBRUARY

0900 - take off.
To Punto Espinoza, pick up Cox and Billeb; on to Cape Berkeley and drop off Williams, McBirney and Cox; return to Baltra with Billeb.
Starting from Baltra: Williams, McBirney.

THURSDAY - 6 FEBRUARY

0900 - take off.

To Cape Berkeley and pick up Williams, McBirney and Cox; then to Togus Cove to drop off above 3; then to S. Narborough to pick up Fosberg; Cavagnaro, and Ashlock; then to Duncan and drop off Cavagnaro and Ashlock; then to Academy Bay for drop off of Fosberg and Billeb.

Starting from Baltra: Billeb.

FRIDAY - 7 FEBRUARY

0900 - take off.

To Togus Cove and pick up Williams, Cox, and McBirney; then to Jervis and drop off there 3.

Start from and return to Baltra empty.

SATURDAY - 8 FEBRUARY

0900 - take off.

To Jervis and pick up Williams, Cox and McBirney; then to Duncan, drop Cox and Williams and pick up Ashlock and Cavagnaro; then to N.W. corner Janes and drop off McBirney, Cavagnaro and Ashlock.

Starts from and returns to Baltra empty.

SUNDAY - 9 FEBRUARY

0900 - take off.

To Duncan and pick up Williams and Cox; then to N.W. James, drop off Cox and pick up Cavagnaro and Ashlock; then drop off Williams, Cavagnaro and Ashlock at Academy Bay.

Start from and return to Baltra empty.

MONDAY - 10 FEBRUARY

0900 - take off.

To S. Narborough and pick up Hendrickson and Kiester; on to N.W. side of James and pick up McBirney and Cox.

No scientists start from ship; all 4 are picked up and returned.

Brunborg, E. & Petersen, C.G.

Rundt, jorden rundt på Tommanesland.
1-254 Oslo, 1964.

Account of voyage, including
visits to Tiamotus and Coroz Keeling.
in Norwegian

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